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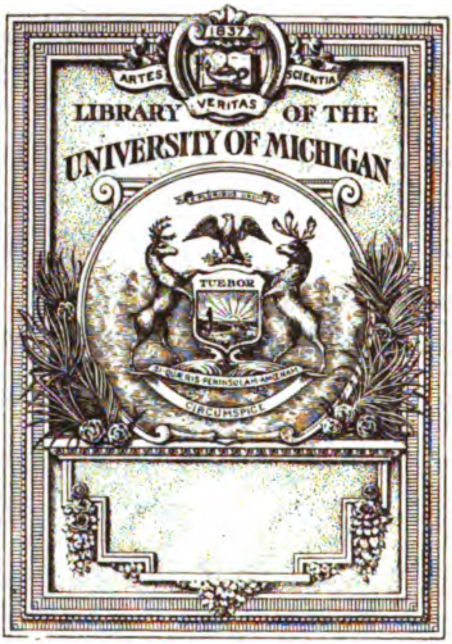

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TO

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SECRETARY AND EXECUTIVE OFFICER

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The Ohio Public Health Journal

OHIO STATE BOARD OF HEALTH

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METHODS AND CHANNELS OF INFECTION.

E. F. McCampbell, Ph. D., M. D.,
Secretary and Executive Officer, Ohio State Board of Health.

INFECTION DEFINED.

The term infection implies the entrance of animal or vegetable organisms into the body of another animal or plant, their multiplication and their injury to that body. In most instances the organisms enter the tissues of the animal or plant body, although this is not true in every case of infection. It is possible in certain instances to produce the symptoms of an infection by the introduction into the body of the chemical products elaborated by some pathogenic organisms. For example, the injection of tetanus toxin into the body causes the typical symptoms of tetanus to result. Tetanus toxin is made by growing *B. tetani* in beef broth under anaerobic conditions and filtering out the bacteria by passing through porcelain. These chemical products do not occur naturally unassociated with the pathogenic organisms and therefore they do not produce infections when artificially injected, in the usual sense.

The disease producing organisms with which we will especially concern ourselves in the subsequent discussion are those which are very minute in size and are of three kinds: first, bacteria; second, protozoa; and third, ultramicroscopic micro-organisms or viruses.

It is essential to have clearly in mind what is meant by an infectious disease and a contagious disease before entering into any detailed discussion, although some authorities attempt to make no distinction. An *infectious disease* is any disease which is produced in the plant or animal body which is due to a foreign animal or plant organism. The name is applied to the nature of the cause of the disease. A *contagious disease* is an infectious disease which is transmitted from one individual to another by contact. The term refers to the method of transmission rather than to the cause of the disease. It is possible that certain contagious diseases may be transmitted by indirect contact or by the agency of fomites but many authorities now

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hold the view that these factors are non-essential and that most contagious diseases are transmitted by direct contact.

MICRO-ORGANISMS OF DISEASE CONSIDERED AND CLASSIFIED.

Pathogenic Bacteria. Bacteria which produce disease are known as *pathogenic bacteria.* Of the many thousand species of bacteria only a comparatively few species have anything to do with the disease processes in the plant or animal body. Those bacteria which are capable of growing in the body of animal or plant may be designated as parasitic bacteria. Some bacteria can grow only in the animal or plant body and do not exist for any period of time outside of it. They are known as *obligate parasites.* There are others which may produce disease in the animal or plant body which can grow and reproduce outside the body. They are known as *faculative saprophytes.* There are still other bacteria which ordinarily live outside the animal and plant body and which exist largely upon dead organic material, which when taken into the body occasionally produces disease processes. They are called *facultative parasites.* As an example of an obligate parasite the *Bact. lepræ* of leprosy may be cited, although in this instance certain observers have claimed to have cultivated the bacillus in pure culture. However, the results are not in any sense uniform. Improved bacteriological technic has made possible the cultivation of a large number of bacteria which heretofore were regarded as obligate parasites. *B. Typhosus* of typhoid fever and the *Msp. comma* of cholera are examples of facultative saprophytes and *B. tetani* of tetanus and *Bact. welchii* of gaseous gangrene may be mentioned as examples of facultative parasites.

Pathogenic Protozoa.. There are several infectious diseases in man and animals which are caused by pathogenic protozoa. Among the common diseases due to protozoa there may be mentioned malaria, syphilis, rabies, amebic dysentery, Texas fever, infectious jaundice of dogs, and the various trypanosome infections, such as sleeping sickness, nagana, dourine, and mal de caderas. It is difficult to artificially cultivate the pathogenic protozoa outside the animal body in pure culture. The *Trypanosoma brucei* of nagana and the *Trypanosoma lewisi* of the rat have been cultivated. The *Entamoeba coli* and the *Entamoeba tetragena* of dystenery, the various types of the *Plasmodium malariæ,* and the *Treponema pallidum* of syphilis have also been cultivated, and it is stated that under certain conditions the *Piroplasma bigemium* of Texas fever may be artificially grown.

Ultramicroscopic Microörganisms or Viruses. There are some infectious diseases the causes of which have never been discovered. The infectious agents in most instances cannot be cultivated and cannot be stained by the ordinary bacteriological methods. The presence of ultra-microscopic organisms has been demonstrated in several ways. For example, when the ordinary bacterial culture is run through a fine porcelain filter, the filtrate contains no microörganisms and consequently when inoculated into animals is non-infectious, although if soluble toxins be present there may be evidences of an intoxication. When the viruses or the infected body fluids of men or animals suffering from the diseases mentioned below are passed through a fine porcelain filter the filtrate remains infectious, therefore demonstrating that the viruses or microörganisms are filtrable and are probably so small that they cannot be seen. Examples of diseases due to agents belonging to this class are as follows: hog cholera, yellow fever, foot-and-mouth disease, rinderpest, epithelioma contagiosum of fowls, chicken typhus, horse sickness, and acute poliomyelitis. There are several infectious diseases of unknown cause, the viruses of which are not filtrable, for example, smallpox, cowpox and vaccinia, typhus fever and Rocky Mountain spotted fever. There are still other diseases of unknown cause about which nothing is known regarding the filtrability of the etiological agents of the disease. Scarlet fever, chicken-pox and measles belong to this class. These diseases can be inoculated into animals only with great difficulty and the virus cannot be cultivated or secured in sufficient quantities from the experimental animals for study. A possible explanation of some of these diseases of unknown cause may be found in the proposition that two microörganisms may each produce non-toxic substances, and that when these non-toxic substances come together, a toxic substance may be produced. This condition of affairs might explain certain infectious diseases in which microörganisms are known to occur and in which they cannot be directly connected with the disease as causative factors. For example, the *Strept pyogenes* very frequently occurs in both scarlet fever and smallpox. It has been shown absolutely that this organism is not the cause of these diseases, but there is a remote possibility that it may act in the so-called associate relation with some other microörganism or virus as mentioned above and produce the typical symptoms of these diseases. It has been recently demonstrated that scarlet fever is due to a filtrable virus but there is every reason to believe that the occurrence of the *Strep. pyogenes* materially changes the character of the infection and makes it more severe. The associative relationship of infectious organisms is probably not the logical explanation for all infections of this character. It might be mentioned in this connection that the view is held by some investigators that some of the infectious diseases of unknown etiology are due to enzymes and that a so-called autocatalysis explains the seeming reproduction in the body of the viruses. This theory is, however, without substantial proof.

THE DISTRIBUTION OF PATHOGENIC MICROBIC AGENTS IN NATURE.

The causal microörganisms of most of our infectious diseases are found principally in the bodies of diseased man or animals. There are some exceptions to their being found only in the bodies of the diseased. Notably examples are found among certain of the wild animals such as the brush-buck, wildebeast and others which serve as reservoirs for the microörganisms of some of the most fatal of protozoal diseases. These animals seem to be naturally immune. Various insects which are factors in the transmission of certain infectious diseases do not suffer from these diseases in any form and are naturally immune. The most common source, however, is the diseased animal or human body. There is no doubt, for example, that the natural habitat of the *Bact. diphtheriae* is in the throat and nasal passages of persons suffering from or convalescing from diphtheria. Occasionally these bacteria are also found in the nasal passages and throats of persons who have never had diphtheria. The *B. typhosus* of typhoid fever also has its natural abode in the intestinal tract of persons suffering from or convalescing from the fever. The same is true with the majority of the causal microörganisms. There are some microbic agents, however, which exist in the soil but probably do not undergo multiplication such as the *B. tetani* of tetanus or lockjaw, *Bact. welchii* of emphysematous or gaseous gangrene, and the *B. botulinus* of meat poisoning. These bacteria sometimes exist in the intestinal tracts of animals such as the horse and in all probability their occurrence in the soil is due to their deposition in manure.

THE OCCURRENCE OF PATHOGENIC MICROBIC AGENTS UPON AND IN THE BODIES OF HEALTHY ANIMALS AND MAN.

The exposure to the air of the external surfaces of the body, of course, makes it especially easy for microörganisms to collect upon them. The large percentage of the microörganisms which collect on the external surfaces are non-pathogenic but there are frequently disease producing ones among them. The various varieties of the *M. pyogenes* are almost universally preesnt on the skin and also on the exposed mucous membranes. *Strept. pyogenes, Bact. inflenza, Bact.*

tuberculosis, M. intracellularis var. meningitidis, Strep. pneumoniae, Bact. diphtheriae and many other species may be present. The mouth and nose are excellent places for microörganisms to collect and excellent for their growth as the requisite conditions such as food, heat and moisture are present. It has been stated on competent authority that all the species of bacteria which have been described as occurring in various parts of the body have also been found in the mouth. These bacteria do not necessarily produce disease or injure the body unless the vitality is lowered and they enter into the tissues. They feed upon the desquamating cells and the excretions. It is exceedingly interesting to note that *Bact. tuberculosis* and *Bact. diphtheriae,* as before stated, have been found in the nose of persons who have never had these diseases. These bacteria have also been shown to be virulent and undoubtedly such persons are extremly dangerous to other more susceptible persons. It is also ferquently noted that pathogens are found in the bodies of persons after they have recovered from the disease and that these individuals disseminate the microörganisms and infect non-immune individuals. This may be the case in diphtheria, typhoid, Asiatic cholera and dysentery, "bacillus carriers."

In regard to the occurrence of microbic agents in the internal organs of the body the following may be said. For a long time it was claimed that the internal organs of man and animals were sterile. Neisser is one authority for the statement that the internal organs of healthy animals are sterile. This has been shown not to be the case universally. Experiments have shown that fifty per cent of the internal organs of rabbits, guinea pigs, cats, dogs, mice, horses and cattle are not sterile. *Bact. tuberculosis* has been found in absolutely normal human and bovine lymph glands. The various pus-producing micrococci have been frequently found in the spleen, kidney, liver, etc. Perhaps the commonest group of bacteria to be isolated from the internal organs are the intestinal forms. It has been demonstrated that intestinal microörganisms invade the tissues with surprising rapidity when for any reason the resistance of the body is lowered. It has been noted also that there are more bacteria in the internal organs of animals which have been fasted than in those which have been fed. Peristaltic action and the diffusion of food through the intestinal wall may be influencing factors. The fact that the internal organs are not sterile in every case is important as it may account for the so-called autogenic infections.

THE MANNER INFECTIOUS AGENTS ENTER THE BODY AND THEIR SOURCE.

Air-borne Infections. The causal microörganisms of infectious diseases are frequently excreted from the body of the diseased individual and are deposited on the clothing, furnishings, floors and walls or on the ground. These microörganisms probably do not proliferate except in rare instances, but frequently remain virulent for a short period of time and are capable of being carried through the air for short distances, producing in certain instances disease in other individuals. There is no doubt that in diseases such as smallpox, measles, scarlet fever and other acute exanthematous diseases together with such diseases as plague and diphtheria that the infectious agents may be carried through the air after having been deposited on clothing and furnishings. However, recent investigations have shown that this method of transferring infection is comparatively rare and that most infections are transmitted by direct contact.

In the beginning it was supposed that the only way that bacteria could be carried in the air was after having been dried on particles of dust and carried by currents of air. This, however, has been shown not always to be the case and we now know that infectious microörganisms may be carried on small particles on droplets of sputum or moisture. These two types of aerial infection are known respectively, as dust and droplet infection.

Dust Infection. Infectious microörganisms to remain virulent and to produce infection must be able to successfully resist drying after being affixed to particles of dust. After being dried the particles are frequently moved and whirled about by air currents. The larger particles of material quickly settle down but the small, almost invisible pieces of dried material may remain suspended for three or four hours. It is these small particles which are usually inhaled or deposited on the skin and mucous membranes of normal individuals that produce infections providing the microörganisms have not been killed by drying or exposure to sunlight. *Bact. tuberculosis* is sometimes carried in this way as well as certain other pathogens. The extent of such dissemination is quite limited.

Droplet Infection. It has been demonstrated that during the processes of talking, coughing, and sneezing, small bubbles or droplets of sputum are thrown out in the air. These particles remain suspended for sometime and may be inhaled or deposited elsewhere. It is surprising the distance that these small particles may be carried. It is stated that they are frequently thrown out thirty feet or more. It has been shown that *Bact. tuberculosis* is rarely thrown out over four or five feet by the cough of the tuberculous individual. It should be remembered that these bacteria will remain alive two or three weeks when in the dark but that they live only a few hours when exposed to the sunlight. The pathogenic microörganisms or viruses which are disseminated by droplets of moisture, are those of whooping-cough, mumps, measles, influenza, epidemic meningitis, and pneumonia.

Air-borne infections rarely occur, as previously stated, and are not of great importance in the open air where sunlight has free access to the disease germs but this type of infection sometimes occurs in crowded quarters such as in dark shops, schools, tenements and railway trains. However, the factor of direct contact must be given its due weight in such instances.

Water-borne Infections. Straight infections of this type occur in practically only five diseases, namely, Asiatic cholera, typhoid fever, paratyphoid fever, and in dysentery of the amoebic and bacillary forms. The length of time that these microörganisms will remain alive in the water depends on the quantity and quality of organic matter present. Only under rare circumstances do bacteria proliferate in water of very high organic matter content. Ordinarily microörganisms will live only a few days if the water is absolutely pure. They have, however, been known to live for several weeks in ordinary river water. The drinking of water or of fluids or material contaminated by water is the common but not the only way these diseases are acquired.

Infections from Soil. The soil as a source of infectious microörganisms is of importance in only a few diseases, namely, anthrax, tetanus, symptomatic anthrax, malignant edema, emphysematous gangrene, Asiatic cholera, and typhoid fever. In the first five mentioned, infection always takes place through some wound usually in the skin and in the last two diseases mentioned, infection is usually through the intestinal tract but may also occur by means of wounds. The microörganisms of anthrox, tetanus and emphysematous gangrene, or more specifically the spores, will remain in soil for long periods of time. They are sometimes found in the active vegetative stage but it is probable that they do not proliferate to any extent in the soil. They exist as ordinary saprophytes. The microörganisms of typhoid and cholera have been known to remain alive for a year or more in soils containing large quantities of organic matter. The various pyogenic micrococci are also occasionally found in the soil and may enter the body of man and animals through wounds. These last mentioned organisms may live for indefinite periods oftime on the skin and only enter the body when the resistance of some tissue is lowered.

Infection from Food. Quite a large variety of pathogenic microörganisms have been found in the various food products. Milk is perhaps the most common food product to be infected. The causal agents of diphtheria, scarlet fever and some other diseases have been disseminated by means of milk. Milk contaminated by water containing *B. typhosus* may be the means of conveying typhoid fever, and the dissemination of Malta fever is accomplished by the drinking of the milk of infected goats. Typhoid fever has also been known to have been acquired from the eating of vegetables which have been washed in water containing the pathogens. Oysters and various shell fish have been known to carry the microbic agents of typhoid fever and Asiatic cholera. Three infections coming from meat sometimes occur, namely, botulism, infectious enteritis and occasionally paratyphoid fever. In these instances the causal microörganisms are in the meat. Another type of infection known as ptomain poisoning also occurs from the eating of meat, fish or other proteins which have been acted upon by saprophytic bacteria and the proteins split up into toxic substances.

Animal Carriers of Infection. Animals may communicate disease microörganisms to one another and to man in three ways: namely, first, by direct or indirect contact; second, by serving as mechanical carriers from one individual to another; and third, by serving as intermediate hosts for the microbic agent and then subsequently communicating it to another. As example of the first proposition, the fact that anthrax has been communicated from sheep to man by contact may be mentioned. It has also been stated that the cat, while not suffering from true diphtheria, seems to be able to transmit this infection and the dog may also transmit rabies to man. In the second method of transfer, the mechanical carrying of an infection, the insects are principally concerned. It is well demonstrated that common flies frequently carry *B. typhosus* on their feet from the infected patient or the excreta and deposit them on the food materials thus causing infection when the food is eaten. The various suctorial insects also may suck up the blood of one individual and carry the infectious agent to the normal individual. Notable examples of this are found in the transmission of the various trypanosomiases by the tsetse and other tropical flies, and of Rocky Mountain spotted fever by the wood tick. The same is true of *Bact. pestis* of plague which is carried by the flea, of Texas fever by the cattle tick, and it has been shown recently that the louse may be one of the agents in the transmission of typhus fever. As an example of the third method, the serving as an intermediate host and the carrying of the causal agent, the mosquitoes which serve as the only means of transmission af the causal microörganisms of malaria and yellow fever and in which these parasites pass a certain cycle of their existence, may be mentioned.

Human Carriers of Infection. It has been stated previously that man is capable of carrying infectious agents when he himself is not infected. For example, in the case of diphtheria it has been repeatedly shown that convalescents from diphtheria, persons who have had the disease, and persons who have never had the disease, frequently carry the etiological microörganisms of this disease in a virulent form and are accordingly exceedingly dangerous as disseminators. Not uncommonly persons who have had typhoid fever carry large numbers of virulent *B. typhosus* in their bodies, particularly in the gall bladder, and disseminate them through the intestinal excreta thus causing many infections when this excreta comes in contact with water used for drinking purposes or food supplies. *B. typhosus* may be carried for many years, one case of twenty years being on record. Asiatic cholera is occasionally carried in the same way. It has also been shown that well individuals may carry the etiological agents of epidemic cerebrospinal meningitis and acute poliomyelitis or infantile paralysis. Individuals who carry infectious organisms are popularly known as "bacilli carriers" and should always be kept under rigid quarantine or observation.

Contact Infections. It is only necessary to emphasize certain points in addition to what has been said in the foregaing. It has been stated that animals may communicate an infectious agent to other animals of the same or different, but susceptible species, by direct contact. Probably the commonest diseases to be communicated by animals to each other are tuberculosis and glanders. This is commonly accomplished by the rubbing of the mouths and noses together although the disease may be acquired in other ways. Among the human race the diseases which are usually communicated by the contact of one individual with another are diphtheria, scarlet fever, smallpox, chicken-pox, mumps, measles, gonorrhoea, chancroids and syphilis. In the six first mentioned diseases it seems that the expirations and possibly in rare instances the desquamations of the skin in those which have an eruption carry the causal microörganism. The infectious agent is inhaled into the nose or throat. Some of these diseases may be in rare instances transmitted by intermediate agents, clothing, etc., (fomites). In the last three diseases mentioned, which are known as the venereal diseases, an abrasion of the integument is a prerequisite and the infectious agent must enter by this route. Infection is usually brought about by the absolute contact of one individual with another. In leprosy also almost direct contact is necessary for a transfer of the infectious agent.

THE ROUTES BY WHICH INFECTIOUS MICROÖRGANISMS ENTER THE BODY.

Microörganisms enter the body through either the external or internal surfaces. It has been shown that the absolutely healthy and intact skin furnishes an efficient barrier to the entrance of infectious agents. Pathogenic bacteria, for example, the streptococcus and the various varieties of the staphalococci are present on the skin almost continuously yet do not often produce infections. When there is an abrasion of the skin or a diseased duct or hair follicle the bacteria frequently pass down into the skin and an infection results. When the pyogenic bacteria, such as mentioned above, are vigorously rubbed into the skin, infection sometimes takes place but in this instance also there has been some mechanical injury to the skin. Minute unobserved abrasions of the skin also serve as points of entrance for the *Bact. pestis* of the plague in certain instances. The microörganisms of tetanus, anthrax, symptomatic anthrax and malignant edema always enter the skin through wounds. Sometimes the infectious agents remain local and at other times are carried from the point of the original entrance and this may take place in different lengths of time. For example, in tetanus the bacteria remain localized in most instances at the point of the original wound and disseminate their toxin from this point. In the various pyogenic infections the bacteria usually remain localized. However, in anthrax the bacteria are carried into the circulation within a very few minutes after they enter the wound. In the new-born, infection very frequently enters the body through the umbilicus or naval. Tetanus is one of the common diseases acquired in this way in certain localities. Microörganisms may also enter the skin through the wounds made by insects, such as mosquitoes, flies, ticks, and fleas. The larger and the clearer cut the wound the less the danger of infection because of the mechanical and bactericidal barrier of the fibrin and the bactericidal action of the blood serum. A free flow of blood also washes the microörganisms out of the wound. Crushing wounds are especially dangerous inasmuch as there is not a free flow of blood and also there is a good chance for the growth of anaerobic bacteria such as those of tetanus, malignant edema, symptomatic anthrax and emphysematous gangrene.

The mucous membranes of the nose, throat and mouth are quite resistent to infection. The epithelial coat, the mechanical action of the saliva are the barriers. Infections of the thin non-resistant mucous membranes of the new-born do occur and necrosis sometimes results (noma). The mucous membrane of the mouth and throat is freqeuntly the seat of primary infection when it is injured. The actinomycotic fungus usually enters a lesion in the mucous membrane made by straws and other substances. The ducts of the salivary glands also serve as points of entrance for certain infectious agents. The tonsils are very commonly the seat of infections especially with the *Strept. pyogenes* and *Strept. pneumoniae.* Septicemias, as for example, those occurring in diphtheria and especially in scarlet fever, frequently arise from infection of the tonsils wtih *Strept. pyogenes.* These structures are also the primary point of invasion in cases of acute rheumatism and possibly in certain cases of pulmonary tuberculosis. The nasal mucous membrane is undoubtedly more permeable to infectious agents than that of the oral cavity. The microörganisms of acute epidemic meningitis, acute poliomyelitis, measles, leprosy and glanders undoubtedly most frequently enter the body through lesions in the membranes of the nose. Infection may be carried into the nose directly or pass from the conjuctiva through the naso-lachrymal duct.

The flora found in the eye is quite extensive. The conjunctiva is not frequently the seat of primary infections. The pyogenic cocci and the *M. gonorrhoeae* are among the common infecting agents. It is possible that certain points of infection are provided by the conjunctive being injured by dust particles. The tears are not bactericidal and only serve to mechanically wash the eye. Infections of the conjunctiva are frequently very severe. There is no doubt also that other pathogens are caught in the eye and washed into the nose where they set up infections or are carried through the membranes to set up infection elsewhere. *M. intracellularis var. meningitidis* of epidemic meningitis is known to pass in this way and possibly *Bact. pestis* of the plague in certain instances.

Infectious microörganisms after being taken into the body through the nose or the mouth may either pass to the lungs through the trachea or down the esophagus to the stomach and intestines. During the ordinary inspiratory part of respiration it is probable that microörganisms cannot pass directly into the alveoli of the lung as the tortuous passage, the mucous and the cilia are fairly efficient barriers. Bacteria may be inhaled directly into the finer bronchi and the alveoli during forced inspiration such as that attendant upon hiccoughing and sneezing. Infections of this kind occur in pneumonia, tuberculosis, and influenza. Microörganisms frequently lodge on the membrane of the trachea and are here taken up by the leucocytes and carried to the lungs, bronchial lymph glands, and occasionally to other parts of the body by the blood and lymph. It is probable that such a form of infection occurs sometimes in pneumonia, tuberculosis and plague.

Infectious microörganisms very frequently pass down to the stomach and intestines. The mucous membrane of the stomach is normally very resistant to infection due to the hydrochloric acid which is normally present in the gastric juice and which in normal amount is distinctly antiseptic. It should be remembered that in instances where the acidity of the stomach is lowered that microörganisms will develop. All toxins with the exception of that of *B. botulinus* of meat poisoning are destroyed by the gastric juice. The intestines are less resistant to infection. It is here that the causal microörganisms of typhoid fever, Asiatic cholera, chicken cholera and dysentery and the various hemorrhagic septicemias find their particular affinities. These bacteria enter or attach themselves to the intestinal wall and in the case of cholera and dysentery this in the only point of infection. The *B. typhosus* has occasionally been known to enter at other places. This bacterium, however, commonly localizes in the lymphatic patches (Pyers) of the intestines, and may in certain instances enter the blood from this point. It should be noted that some bacteria can pass through the wall of the intestine when it is seemingly intact. This point has been repeatedly demonstrated in the case of *Bact. tuberculosis.*

The genital organs of the male and female are susceptible to infection with microörganisms in certain instances. The *M. gonorrhœae* of gonorrhœa and the *Treponema pallidum* of syphillis find their usual portals of entry in the genital tract. They have, however, been known to infect other parts of the body as the mouth, rectum, and the conjunctiva. The etiological bacteria of gonorrhœa can penetrate the seemingly intact male urethra but not the vagina of the female on account of the bactericidal secretion and the character of its squamous epithelium. Other bacteria, as for example, the *Strept. pyogenes, M. pyogenes var. aureus* and *B. coli* are sometimes found infecting the genital tract in cases of chronic urethritis.

The kidneys, ureters and bladder are sometimes infected but usually the infecting agent is carried in the circulation although it occasionally ascends through the urethra from without.

In conclusion, the proposition of germinal and antenatal infection must be mentioned. By true germinal infection is meant the carrying of the infectious organisms of a disease by the ovum or the spermatozoa and its incorporation in the development of the embryo and fetus. It is doubtful if this ever occurs. Some authorities claim that it is possible and that it has been demonstrated that the spermatozoa may carry the *Treponema pallidum* of syphilis, but this is not generally accepted. Antenatal infection or infection of the fetus before birth does occur. Infectious organisms enter the fetus only as a result of intimate contact with the mother and it has been repeatedly shown that tuberculosis and syphilis may be acquired in this way. It is essential, however, that the mother be infected and in most instances this infection is localized in the placenta. Smallpox, scarlet fever, measles, dysentery, various pyogenic infections, and in rare instances pneumonia, have also been acquired by placental infection. In rare cases in animals, anthrax, symptomatic anthrax, chicken cholera, and glanders have been acquired by antenatal infection from the mother.

(To be continued.)

A SURVEY OF INDUSTRIAL HEALTH-HAZARDS AND OCCUPATIONAL DISEASES IN OHIO.

E. R. Hayhurst, A. M., M. D.

Director of the Division of Occupational Diseases, Ohio State Board of Health.

PART I.

HISTORICAL NOTES.

In the First Annual Report of the Ohio State Board of Health, 1886, page 10, we read that the President appointed a standing committee upon Hygiene of Occupations and Railway Sanitation, with Dr. John D. Jones, Cincinnati, as chairman. The Second Annual Report (1887) contains a five-page article by Dr. Jones upon "The Effect of Occupation Upon the Health of Individuals", in which occurs an account of the danger to lead-workers, white lead-workers, barrel-fillers, file-cutters, saw-makers and tool-makers, wool and cotton workers, employes in gas works, as well as a discussion of fresh air and light, the employment of women, and a table adopted from Dr. Wm. Ogle, of London, England, showing the mean annual death rate of males in various occupations.

The next year (1888) a most masterly article in this field, entitled, "The Luminous Beam", was written by Josiah Hartzell, Ph. D., Canton, Ohio, who is at present a member of the State Board of Health.* This paper was read before a Sanitary Convention held under the auspices of the State Board of Health at Akron, Ohio, January 25th and 26th, 1888, and is contained in the Second Annual Report of the State Board of Health, 1887. The opening statement in this paper is as follows:

"All intelligent workers in behalf of good health clamor for ventilation.

"Why?

"To the end that the air to be breathed into the lungs may be abundant in supply and pure in quality."

"Everyone is familiar with the appearance of a sunbeam piercing the darkness of a darkened room." With this sunbeam as the theme, the author next discusses, in a most able and interesting manner, the dust particles, smoke particles, germ growths, and various effusive matters, which can be seen to pollute this luminous beam. The author takes up the subjects of "sawgrinder's consumption", "potter's asthma", "brassfounder's ague", lead colic, matchworker's disease, etc., and states that in all these employments it may be shown that both the sick and death rate have been materially lessened by promoting ventilation; notably, by the application of certain devices for the protection of workmen from the inhalation of dust and harmful fumes.

Since the dates referred to above, laymen as well as medical men have repeatedly called the attention of the public to the subject of industrial hygiene and occupational diseases. Finally, in 1913, or twenty-nine years after the first citation above given, the Legislature of the State of Ohio passed two bills as follows: (1) House Joint Resolution No. 12, (see below) "Authorizing and directing the State Board of Health to make an investigation of occupational diseases", also authorizing the Board to make a thorough investigation of industrial hygiene; and (2) an act "To require the reporting of certain occupational diseases" to the State Board of Health, by every physician in the state, attending or called upon to visit a patient whom he believed to be suffering from occupational poisonings, or or any other ailment or disease contracted as a result of the nature of the patient's employment. In addition to the above two, which have laid the foundation for this report, there was passed an act "For the prevention of occupational diseases with special reference to lead poisoning." But as this act particularized the manufacture of certain lead compounds, it has eventuated in applying to but two or three establishments in the state, and to the protection of some less than 300 employes.

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*Dr. Hartzell died at his home in Canton, Ohio, on November 11, 1914, at the age of 83 years.

During the course of this survey, early in 1914, two very important judicial decisions have been rendered, one by Judge Robert C. Pugh, of the Superior Court of Hamilton County, declaring "lead poisoning" to be a "personal injury", and allowing the complainant an indemnity against his employer of $500. The second decision was of much greater importance, and was made by Judge O. J. Cosgrave, of the Common Pleas Court, Hamilton County, overruling the position taken by the Industrial Commission of Ohio and declaring that an occupational disease is a personal injury and therefore should come under the new insurance law for compensating persons meeting personal injury while in the course of their employment.

The funds for the establishment of the Survey of Occupational Diseases became available May 1st, 1913. The investigations began May 15th, 1913, the first month being spent in statistical researches, the printing of forms, etc. The factory and workshop investigations began June 9th, 1913, and have continued without interruption up to the time of publishing this report. By the first of September, 1913, printed matter, calling the attention of physicians throughout the state to the occupational disease reporting law, and blanks for reporting the same were mailed to 7,500 physicians within the state. Realizing that publicity was, and is, a principal feature in a public health matter of this sort, the Division of Occupational Diseases has compiled and issued some twelve pamphlets upon this subject, each article being first printed in the MONTHLY BULLETIN of the State Board of Health. A part of the Public Health Exhibit of the State Board of Health has been given to the subject of industrial hygiene and occupational diseases. In connection with the Exhibit a short lecture, accompanied by stereopticon slides, and moving pictures, has been given several times a month in various cities of the state.

* * * * *

House Joint Resolution No. 12 and House Bill No. 187, copies of which follow, are the two enabling acts which authorized the investigation of occupational diseases by, and the reporting of the same to the State Board of Health. A copy of the blank certificate used for reporting and the instructions accompanying the certificate follow:

(House Joint Resolution No. 12.)

Laws of Ohio, 1913, Vol. 103, p. 975.

JOINT RESOLUTION

Authorizing and directing the state board of health to make an investigation of occupational diseases.

Whereas, The employment of men and women in certain occupations is known to be attended with more than ordinary danger to health, giving rise to what is known as "occupational diseases", and

Whereas, Unnecessary sickness and shortening of life, from whatever cause, is a serious loss and of grave concern to the state and to all the people, and

Whereas, It is believed to be possible, by public education and by the enforcement of proper measures, to largely prevent unnecessary sickness and premature death among employes in various trades and occupations, therefore,

Be it resolved by the General Assembly of the State of Ohio, That the state board of health, is hereby authorized and directed to make a thorough investigation of the effect of occupations upon the health of those engaged therein with special reference to dust and dangerous chemicals and gases, to insufficient ventilation and lighting, and to such other unhygenic conditions as in the opinion of said board may be specially injurious to health, and to report to the next general assembly the results of such investigation, with such recommendations for legislative or other remedial measures as it may deem proper and advisable.

Be it further resolved, That the finance committee of the House and the Senate be requested to place in the general appropriation bill an appropriation of $7,000 for the year 1913 and $7,000 for the year 1914 for carrying on the above work by the state board of health.

C. L. Swain,
Speaker of the House of Representatives.
Hugh L. Nichols,
President of the Senate.

Adopted February 13th, 1913.

1913.
Jan. 23 — First introduced by Mr. Acker.
Jan. 23 — Laid over under the Rules.
Jan. 27 — Referred to Committee on Labor.
Jan. 29 — Referred back from Committee on Labor.
Jan. 31 — Recommitted to Committee on Finance.
Feb. 6 — Reported by Committee on Finance.
Feb. 10 — Adopted by House.
Feb. 12 — Passed by the Senate. Amended.
Feb. 13 — Concurred in by House of Representatives.
Feb. 25 — Enrolled and signed.
Feb. 28 — Filed in office of Secretary of State.

Laws of Ohio, 1913, Vol. 103, p. 184, (Sections 1243-1 to 4, G. C.)

(House Bill No. 187.)

AN ACT

To require the reporting of certain occupational diseases.

Be it enacted by the General Assembly of the State of Ohio:

SECTION 1. Every physician in this state attending on or called in to visit a patient whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, brass, wood-alcohol, mercury or their compounds, or from anthrax, or from compressed air illness, or any other ailment or disease, contracted as a result of the nature of the patient's employment, shall within forty-eight hours from the time of first attending such patient send to the state board of health a report stating:

(a) Name, address and occupation of patient.

(b) Name, address and business of employer.

(c) Nature of disease.

(d) Such other information as may be reasonably required by the state board of health.

The reports herein required shall be made on, or in conformity with, the standard schedule blanks hereinafter provided for. The mailing of the report, within the time required, in a stamped envelope addrssed to the office of the state board of health, shall be a compliance with this section.

SECTION 2. The state board of health shall prepare and furnish, free of cost, to the physicians included in the preceding section, standard schedule blanks for the reports required under this act. The form and contents of such blanks shall be determined by the state board of health.

SECTION 3. Reports made under this act shall not be evidence of the facts therein stated in any action arising out of the disease therein reported.

SECTION 4. It shall furthermore be the duty of the state board of health to transmit a copy of all such reports of occupational diseases to the proper official having charge of factory inspection.

C. L. SWAIN,
Speaker of the House of Representatives.
HUGH L. NICHOLS,
President of the Senate.

Passed March 25, 1913.

Approved April 23, 1913.
JAMES M. COX, *Governor.*

Filed in office of the Secretary of State April 24, 1913.

WRITE PLAINLY WITH INK — THIS IS A PERMANENT RECORD.

N.B. — Every item of information should be carefully supplied. The exact statement of OCCUPATION is very important. Physician should state DIAGNOSIS in plain terms. See instructions on back of certificate

OHIO STATE BOARD OF HEALTH

CERTIFICATE OF INDUSTRIAL DISEASE.

NAME OF PATIENT ——————

ADDRESS: Street and No. —————— City or Village ——————

PERSONAL AND STATISTICAL PARTICULARS.

Sex	Age	Color	Country of Birth

Single, married, widowed or divorced (write the word)

Occupation

(a) *Present* trade, profession or work ——————

Particular kind of work in such trade, etc ——————

Date of entering present occupation ——————

Employers' name ——————

Address ——————

Business (kind of goods made or work done) ——————

(b) *Previous* occupations:

Name of occupation	Entered (year)	Left (year)

Previous illness, if any, due to occupation:

Disease or illness	Year

MEDICAL CERTIFICATE OF DISEASE

Diagnosis of present illness ——————

Chief symptoms and conditions ——————

Date first symptoms appeared ——————

Complicating Diseases (such as alcoholism, syphilis, tuberculosis, etc.) ——————

Additional facts ——————

Date of diagnosis ——————, 191——

(Signed) ——————, M. D.

——————, 191—— (Address) ——————

Mail to STATE BOARD OF HEALTH, Page Hall, University Campus.

(ON BACK OF THIS CERTIFICATE IS PRINTED THE MATTER BELOW).

OHIO STATE BOARD OF HEALTH,

COLUMBUS.

AN ACT — To require the Reporting of Certain Occupational Diseases — (Passed March 25, 1913.)

SECTION 1. Every physician in this state attending on or called in to visit a patient whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, brass, wood-alcohol, mercury or their compounds, or from anthrax, or from compressed-air illness, or any other ailment or disease, contracted as a result of the nature of the patient's employment shall within forty-eight hours from the time of first attending such patient send to the State Board of Health a report stating:

(a) Name, address and occupation of patient. (b) Name, address and business of employer. (c) Nature of disease. (d) Such other information as may be reasonably required by the State Board of Health.

The reports herein required shall be made on, or in conformity with, the standard schedule blanks hereinafter provided for. The mailing of the report, within the time required, in a stamped envelope addressed to the office of the State Board of Health, shall be a compliance with this section.

SECTION 3. Reports made under this act shall not be evidence of the facts therein stated in any action arising out of the disease therein reported.

AN ACT — For the Prevention of Occupational Diseases with Special Reference to Lead Poisoning.

SECTION 7. Every physician * * * finding what he believes to be symptoms of lead poisoning shall * * * within forty-eight hours after such examination and finding * * * send a report thereof in duplicate, one copy to the State Department of Factory Inspection and one to the State Board of Health * * * The examining physician shall also, within the said forty-eight hours, report such examination and finding to the employer. (Passed April 18, 1913.)

These forms are furnished by the State Board of Health and should be used for all reports. In filling out, note carefully the instructions below.

INSTRUCTIONS FOR FILLING OUT CERTIFICATE.

In General. The *medical certificate* on the right hand side the physician alone can furnish. The *personal and statistical particulars* on the left hand side must be secured by the physician either from the patient, or, in fatal cases, from the family precisely as for similar information in certificates of death sent to boards of health.

Present Occupation. Precise statement of occupation is very important so that the relative healthfulness of various pursuits may be known. It is necessary to know both general trade or profession (for example, *printer* or *brass worker*) and also the particular kind of work or branch of the trade (as *hand compositor* or *linotype operator* for a printer, or *polisher* or *buffer* for a brass worker.)

Date of entering present occupation is important to determine how long the worker may have been exposed to the hazard before contracting the disease.

Employer's name, address and business are necessary to ascertain distribution of occupational diseases by industries, many trades (e. g., machinists) being common to different industries.

Previous occupations need to be known, if possible, because present illness may be due to a former rather than present occupation, and industrial disease is frequently a cause of change of occupation. Give simply the name of each distinct occupation which the patient may have followed, with the year he entered and the year he left,

Previous Illnesses. This refers either to previous attacks of present disease, or to any other disease, *due to occupation.* All that is required is the name of each such disease or illness with the year in which it occurred. Such information, when it can be secured, will show whether the case reported is the first attack or not, and when combined with statement of previous occupations, will afford an outline history of the patient as to occupational disease.

Medical Certificate. Only the last two items specified for this require any explanation. In making these reports it is necessary to consider the possible influence of factors other than occupation as causes of the disease. For this reason any *complicating diseases* should be noted, such, for example, as alsoholism or syphilis in connection with the arteriosclerosis in cases of lead or other metal poisoning. The possible effect of other factors, such as poor hygienic conditions in the home, or other personal conditions, must be considered, and when discoverable should be noted under *additional facts.*

E. F. McCampbell, M. D., *Secretary.*

THE INDUSTRIAL HYGIENE OF FACTORY PROCESSES (GENERAL), IN OHIO.

E. R. Hayhurst.

A large percentage of employes in shops and factories are employed in numerous operations, which, while more or less peculiar to each industry, are very similar in nature. Such operations do not require special skill or training, as a rule, although experience develops great dexterity and speed in many instances. The workers are capable of being interchanged between various operations. Especially do they change from one establishment to another, and usually take up new operations with each change. Such workers constitute a class slightly in advance of common laborers, and we have classed them as "general factory help". In a rough way they may be grouped into certain processes such as "routine machine operations", "assembling", "inspecting", "finishing", "packing", and the like.

General factory processes were investigated in 100 plants, representing 35 different industries, located in 18 cities, employing a total of 7,946 wage-earners, of whom 5,045 were males and 2,901 were females.

According to the Vital Statistics Reports for Ohio for the years 1910, 1911 and 1912, there were 14,379 deaths among males engaged in Mechanical and Manufacturing Pursuits, of which number 1,977 died of pulmonary tuberculosis, or 13.7%. This is about the same as the rate for all occupations combined (13.3%). The figures for females were too few to be utilized, but indicated, so far as they went, a much higher tuberculosis rate (45.8%). According to the U. S. Mortality Statistics for the Registration Area, pulmonary tuberculosis claims 27.4% of the deaths among females engaged in Mechanical and Manufacturing Pursuits, the rate for males being 15.5%.

So far as could be ascertained, modern methods obtained in 81 establishments investigated, fairly so in 10 more, not so in 4, while the remaining 5 were not reported upon in this respect. Unions, of course, were rare among this class of workers, although in 4 plants these workers were admitted into various "locals" because they were helpers and the like. A managerial interest in workers' welfare was well manifested in 72 places, fairly so in 20 more, not so in 4, and not reported upon in 4. An intelligent type of at least English speaking persons prevailed in 67 places, fairly so in 19 more, while ignorant foreigners, largely non-English speaking, made up the general factory workers in 13 places (the 1 remaining place was not reported upon). There appeared to be no objection to the character of the work performed on the part of the workers, and accordingly they remained steadily as far as this feature was influential in 79 places, fairly so in 9 others, while in 9 more working conditions appeared to be the chief cause of unsteadiness of employment (3 places were not reported upon). In 18 places every reasonable health appliance was found to be present, including appliances for changing the air in the workrom where needed, as well as locally ventilating, or otherwise rendering hygienic, the processes in which the workers were engaged. Such appliances were fairly efficient in 6 more establishments, but in the remaining 76, in most of which there was need of the same, they were either absent or very inadequate. Definite and oganized instructions along health lines, especially in relation to the work being performed, were given in 8 of the plants investigated, and to some extent in 2 others. Such were more or less needed in the remaining 90. In 8 establishments this class of workers was included in sick benefit and similar associations. Regarding the question of skill, in 15 processes in as many places, considerable skill was required, while those in 25 additional places were somewhat skilled. In the remaining 60, such factory processes could be carried on with very little interruption to business or production with a constantly changing work force. Factory workers were employed in hygienically well constructed buildings and workrooms in 51 places, fairly so in 16 more, not so in 29, while this feature was not reported upon in the remaining 4. There was a great tendency to carry on various factory processes in the same quarters or room, and oftentimes along with processes requiring skilled work, so that oftentimes workers were subjected to the hazards of neighboring processes, when, perhaps, those in which they themselves were engaged were without hazard to health.

Age-group estimations for this class of workers summed up as follows:

Age groups.	*No. of Wage-earners.*
Over 50 years	113
From 45 to 50	171
From 40 to 45	550
From 20 to 40	6,900
Under 20 years	212

Females tended very largely to younger years.

A synopsis of the exposures to the various health-hazards, arranged in relation to the number of workplaces, shows as follows:

Health Hazard.	Amount of Exposure (No. of Workplaces.)				Total Workplaces.
	None.	Fair.	Bad.	Not Reported.	
Dust	63	20	16	1	100
Dirt	49	30	21	......	100
Dampness	89	10	1	......	100
Darkness	76	14	10	......	100
Air	44	38	18	......	100
Heat	77	19	4	......	100
Cold	93	5	2	......	100
Fatigue	(See Below)				
Inactivity	(See Below)				
Infections	15	42	41	2	100
Poisons	66	15	19	......	100
Stimulantism	25	56	19	......	100
Several unhealthy appearing persons	53	37	5	5	100

Fatigue was a hazard as follows: hurrying piece-work, 41; monotonous application and reduplication of movements, 37; constant standing (still), 25 (sometimes holes worn in the floor almost the shape of feet); eye-strain, 16;

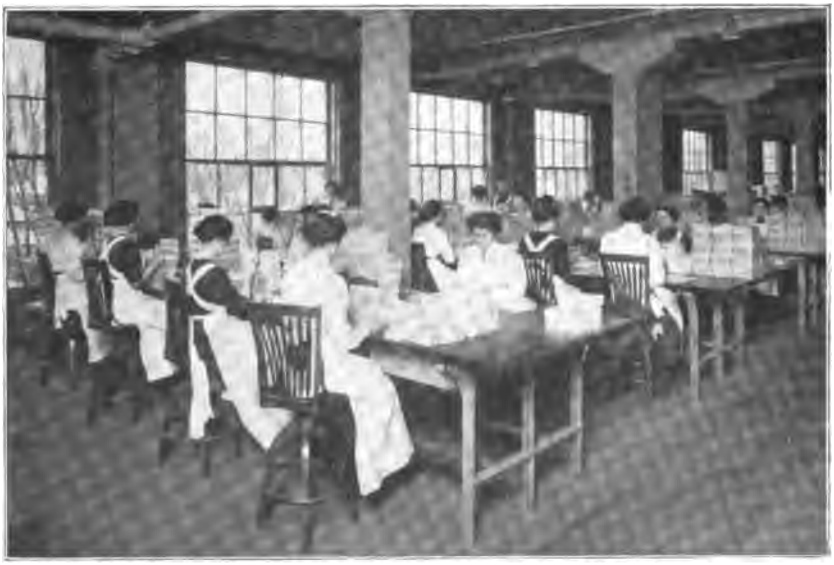

FIG. 37. MODEL FACTORY CONDITIONS.

Note chairs with backs and foot rests for sedentary workers. Spacious and well-lighted room.

prolonged faulty postures, 15; jarring processes, 13; loud noises, 12; speeding up, 11; laborious work, 9; long hours, 8; chairs without back rests, 8; constant and prolonged strain, 6; and body pressure (pressing objects against body, or the body against objects, more or less constantly), 5. In 13 establishments there were rest rooms for female help, in 14 establishments workers were changed between processes, thus avoiding exhaustion, while in a smaller number of instances, various recreation schemes combined with outdoor and gymnasium privileges were devised. To overcome the effects of physical *inactivity,* provisions for exercise or recreation were arranged for in 4 establishments. Much profitable thought could have been given to this in a good percentage of other places. In these 100 establishments the *workday* was found to be 8 hours in 4 places, 8 to 9 hours in 37 places, 9 to 10 hours in 49 places, 10 to 11 hours in 2 places, over 11 hours in 1 place, and not ascertained in the remaining 7, in some of which there were no definite hours observed. The *noon recess* was 1 hour in 32 places, ¾ hour in 9 places, ½ hour in 58 places, and not reported upon in 1. Overtime was of considerable frequency in 3 places, while a night shift was worked in 1.

The liability to the contraction of *communicable diseases* (infections) was determined as negligible in 15 places, a fair hazard in 42, bad in 41, the remaining 2 not being reported upon. The hazards were all of those discussed in previous Parts (II. and III.), but especially would we call attention here to promiscuous spitting upon floors in workplaces by persons who are employed without physical examination and who work without medical supervision. This single factor is overwhelmingly important in the the spread of some 20 infectious and contagious diseases, which involve the nose, throat and lungs, and the germs of which are transferred from person to person by means of the excrement from these parts. The universal use of cuspidors where persons are employed for hours at a time in which to deposit such excrements seems the first logical step in the solution of this question. The association of *appendicitis* with work requiring the use of the right foot or leg, as among machine operators and press workers, was well illustrated by a series of four cases brought to our attention among girls in a shoe factory where they were employed at box-making on machines. They made from 8,000 to 12,000 movements with the right foot daily. The work was also very jarring and wearing upon them. One had acute appendicitis, one chronic appendicitis (possibly complicated with ovaritis), while the other two had continually recurring attacks of right iliac pain with indigestion.

The *poison* hazards to which general factory workers were exposed in the 35 places shown in the table were lead and lead compounds, wood alcohol, turpentine, benzine (petrol, naphtha, gasoline), corrosive salts, amyl acetate, shellacs, lacquers, acids, alkalis, dye stuffs, stains and colors.

The industrial inducement to *stimulantism* (alcoholism, coffeeism, teaism and drugism) was determined as negligible in 25 instances, a fair hazard in 56, and bad in 19. It was due in many instances to the inadequacy of proper drinking water and thirst-assuaging facilities, as well as to the depressing influences of the various hazards given in the table above.

Complaints, covering all manner of health-hazards, insanitary working conditions, and irritating inconveniences, which workers made were too various and numerous, and sometimes trivial to warrant discussing here, but it suffices to say that our investigators, who occasionally stopped to talk with these workers in the course of their factory inspections, reported among them

11 occupationally diseased persons, divided as follows: industrial tuberculosis, 6; lead poisoning, 3; conjunctivitis, 1; and dermatitis, 1; while there were a great many hearsay instances, based upon good evidence, — the hazards were certainly present, — which our investigators had not the time to follow up. Hospitals, dispensaries, charitable institutions, societies and private physicians get the information upon these, but practically none of them keep records and files classing "occupational complaints," hence this source of information was not available to this survey.

Comments. — This class of workers represents such a large group that it should be given more thought, probably, than any of the special processes, to which attention is naturally more definitely directed. However, these workers are prone to get the least attention because of the ever-changing personnel, and lack of skill, and, unlike machinery, each unit which proves defective can be replaced without cost to the manufacturer as long as the supply of labor remains good. It is pre-eminently from this class of workers that the material for crowding hospitals, dispensaries and charitable institutions is collected; it is also from this class of workers that the vast majority of unemployable persons develop. Such persons are rendered unemployable usually fairly early in work life, — one reason for the comparatively small number who are found engaged in industry after 40 years of age. This unemployability is the result, chiefly, of such factors as chronic alcoholism, maiming and crippling, chronic diseases of degenerative character, and social disgust or loss of ambition. In all of these, industrial relations unquestionably have been the chief causes. Probably the greatest good that can be done for this class of workers to keep them "on the job," from a manufacturer's point of view, is to institute brief but concrete instruction along health conservation lines in conjunction with work. Medical supervision should be gradually adopted. The employer is further responsible, of course, for the general sanitary and hygienic features of his place of employment, as well as his methods of working his employes. Moral and housing hazards among employes are so closely associated with industrial relation that it would appear that the employer is, of all persons, the most responsible, especially in that he can demand "his money value for his expenditure for labor," which gives him the right to normal healthy workers and the refusal of such as endanger themselves and their fellow workers by disastrous indulgences and social delinquencies.

GAS PRODUCING.

A comparatively few plants in the State of Ohio make their own producer or generator gas. This is made from coal in a combustion chamber, the fuel being burned to cinders. Illuminating gas is made in a few large cities in which coke is a by-product. Most of the blast furnaces utilize the gases produced for fuel purposes — a continuous mechanical process. The charging with coal and removal of clinkers was mechanically done in all except the smallest plants. The manufacture of special by-products, outside of coke and tar, was not observed anywhere. Ammonia liquor is also produced.

Our investigations covered 7 plants making producer gas and employing a total of 80 men. These were seen in connection with rolling mills, glass works, and lime kilns. In addition, the illuminating gas plants in 2 cities employing a total of 55 men were also seen. (In two plants 4 men were employed in the process of making water-gas.) The employes were nearly all immigrants, foreigners or negroes. Owing to the fact that they worked practically out-of-doors, — most of them engaged as pokers on top of the production furnaces — workers were very little protected by health appliances. The work required very little skill. With the exception of 1 man the workmen seen were all between 20 and 40 years of age. Workers did not remain long in most plants, especially in the summer season.

The *chief hazards* were to the persons who endured exposure to dust, soot, smoke, hot gas fumes and flames during the time that they were required to open the caps over the poke holes on top of the producer furnaces. This happened about every 10 to 15 minutes and lasted 2 or 3 minutes each time. At this time a severe blast poured forth from the opening, against which the workman who stood over the opening in order to break clinkers up, had no protection except to lean back as far as he could. The blast extended from 2 to 10 feet high, and consisted of flames and invisible gas, or was accompanied with immense volumes of smoke, soot and dust. Exposure to *heat* was a hazard for all workers, especially to coke drawers, but the alternating exposure to *cold* between operations during the winter season was a greater hazard. The stokers were usually high up in the air, with only a roof for protection against the weather. Coke wheelers were exposed to clouds of steam from the sprinkled coke. The work itself was not fatiguing for healthy laborers; the 12-hour workday, which obtained in nearly all places, with the absence of a noon recess (a half-hour was allowed in two places), were objectionable features. One place found it expedient to work three 8-hour shifts. Night shifts, of course, were the rule. In small plants, 2 men divided the 24 hours, working 12 hours each. The risk of gas *poisoning* was a fair hazard in all places. It was influenced by the condition of the weather and wind, and especially by the persistency with which the pokers faced the blasts. Producer gas is over four times as rich (34%) in carbon monoxide gas as is illuminating gas (8%). There was every opportunity for the effect of chronic gas poisoning, due to short-intervalled inhalations of gas frequently repeated. Many of the workers were seen to stagger around for two or three minutes after each exposure. In water-gas manufacture there was some risk of carbon monoxide poisoning during sampling, and more, due to leaks; there was also slight risk, due to ammonia fumes, and napthalin which was deposited in clouds at the time of cleaning tanks. Several workers were seen who showed the effects of the work. One case of mental deterioration and another of spinal trouble and anemia were called to our attention, both following severe "gassing" in gas house workers. Two fatalities occurring in 1911 were also reported. *Complaints* included the breathing of gas and smoke, dizziness, "swelling up," the heat during hot weather, getting of foreign particles in the eyes, coughing, difficulty in breathing, indigestion, and rheumatism. The industrial inducement to *alcoholism* was, of course, considerable in most instances.

Comments. — One company furnished blue glasses, which protected the eyes against foreign particles as well as the heat and intense light. Through the spread of the "safety first" idea, greater precautions are being taken when it is necessary to enter gas chambers and passageways, such as providing oxygen apparatus, pulmotors and other first-aid equipments, in addition to gas helmets provided with compressed air blasts, and the careful watching of workers while so engaged. In 1 place a scheme was being worked out to prevent all exposure to the gases and flames as well as the loss of the same while poking, by means of a steam blast placed just inside of the poke hole, which would operate automatically on opening the cover to the same, and would also help in the moistening of the gas. These workers should be provided also with shower bath facilities and proper change-rooms, while medical supervision would prevent the employing of any who had a tuberculous tendency. It is said that even mechanical stokers and mechanical poking of the fuel in the producers is not free from exposure to escaping smoke and gases.

STATIONARY FIRING AND ENGINEERING.

(Boiler Rooms and Power Production.)

The power plants, including the boiler rooms, engine and dynamo quarters, were inspected in a large number of establishments. Only the boiler rooms appeared to present health-hazards worthy of notice. The workers here were firemen, coal heavers and laborers. *Dust, dirt,* ash and coal heaps scattered about, and a certain amount of contamination of the *atmosphere* with escaping gases and occasionally steam, were features in about half of the places. In addition, *damp* and *dark* quarters were frequently seen. In many large places automatic stokers did practically all the work, so that workmen were few and very little exposed, but *heat* was a considerable factor in many places. It was rendered worse by the tendency of the workmen to step out-of-doors between stoking and shoveling to cool off. Another hazard is *fatigue,* which depends no so much upon hard work as upon long hours, especially for workers in hot processes. In practically no places were workers engaged for less than 10 hours, while usually two shifts divided the 24 hours between them. One day's rest in seven was least often observed in this process of any investigated. The liability to the contraction of *communicable diseases* was a considerable hazard in most boiler rooms, due, principally, to promiscuous spitting into places where the dust might carry infection to fellow workmen, to the absence of cuspidors, of adequate washing facilities, poor closets, and the common use of the same drinking cups and towels. In some places, however, all of these features were guarded against. The liability to industrial *alcoholism* in this process is directly in proportion to the inadequacy of proper thirst-assuaging facilities, and wash-up places, as well as too great exposure to heat, and subjection to long hours. Various ones of these factors were *complaints* in the places investigated.

Comments. — As with all heat exposed workers, these men should have the advantage of a properly protected shower bath, change rooms in which to dry out clothing, hours in inverse proportion to the amount of exposure, blue glasses to protect the eyes from heat, light and foreign bodies, and medical supervision to warn those who have a tuberculous tendency to keep out of the process.

According to the Ohio Vital Statistics Reports for the years 1910, 1911 and 1912 there were 649 deaths among Engineers and Firemen (not locomotive) of which number 66, or 10.17%, died of pulmonary tuberculosis. This is better than the combined rate (13.3%) for all trades during the same period, and nearly as low as that of Agriculturists (7.13%). The accident, injury and accidental poisoning rate among them for the country at large is 12.2%.

(*To be continued.*)

MUNICIPAL SANITATION IN COLUMBUS.*

W. H. Dittoe, *Chief Engineer,*

Ohio State Board of Health.

I shall endeavor to briefly explain to you what has been accomplished by the city of Columbus in recent years to promote the public health and comfort of its citizens, and to indicate the duty of the individual in the accomplishment of the greatest benefit from these improvements.

The Ohio State Board of Health is given authority under the law to control the installation of public water supplies and sewerage systems for municipalities. In passing upon a proposed public water supply, the Board requires the provision of a supply of good sanitary quality which may be used without danger for all purposes. In passing upon proposed sewerage systems, the Board endeavors to bring about the installation of sewers adequate for the purpose, and of equipment for proper disposal of the sewage.

The local board of health is actively engaged in enforcing health laws and regulations, which have for their object the improvement of conditions affecting the health and comfort of the citizens. No doubt many rules and regulations of health boards appear, to the average person, to be unreasonable and to inflict unwarrantel requirements upon the people. It is, however, true that such rules and regulations are adopted after careful consideration, and every citizen should accept them as proper and reasonable.

The city of Columbus has been unusually progressive in providing municipal improvements for the promotion of public health and comfort. During the years 1905 to 1910 the city expended some three million dollars in the improvement of its public water supply and sewerage system, and in the installation of plants and equipment for the disposal of sewage and garbage. The improvements of the public water supply during this period entailed a total expenditure of one and one-third million dollars and included a large storage dam and reservoir on the Scioto River north of the city, a water purification and softening plant, and a new pumping station. This work was begun in June 1905 and completed in the fall of 1908, since which time the city has furnished to the citizens a constant supply of purified and softened water. This supply is made available in practically all built-up districts within the city. To realize the great improvement in health conditions resulting from the purification of the Columbus water supply, it is only necessary to know that the statistics of typhoid fever for nineteen years prior to the improvement and for five years subsequent thereto, show a reduction in deaths from typhoid fever equivalent to seventy-six per cent. This remarkable saving of human life has justified the considerable expenditure incurred. Moreover, we now have no outbreaks of typhoid fever such as occurred in 1904 when a total of 1,861 cases of typhoid fever were reported in the city of Columbus.

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*Address to employes of the Kilbourne-Jacobs Mfg. Co., Columbus, December 17, 1914.

The improvements of the sewerage system and the construction of a plant for the treatment of sewage prior to its discharge into the Scioto River, were begun in November 1905 and were completed in the fall of 1908. These improvements entailed an expenditure of almost one and one-third million dollars and were required to furnish more adequate sewerage facilities for the citizens of the city and to correct the very objectionable nuisance which had been caused in the Scioto River below the city. The result of this expenditure has been to enable the city to extend to its citizens the opportunity of adequate sewerage and drainage facilities.

The improvements in the collection and disposal of garbage included adequate collection equipment and a plant for the reduction of the material and recovery of valuable products. This improvement, which was started in November 1908 and was completed in the summer of 1910, required an expenditure of over three hundred thousand dollars. As a result, the citizens of Columbus are supplied with a satisfactory garbage collection service and economical and sanitary disposal of this waste matter.

The provision of these municipal improvements by the authorized officials of the city, was an important step in improving conditions promoting the health and comfort of the inhabitants of the city. However, entire success cannot be realized without full appreciation, on the part of the citizens, of the value of these improvements, and a hearty co-operation in their proper utilization. Regarding the public water supply of the city, it is demonstrated by analysis and typhoid fever statistics, to be of safe sanitary quality. This is not always true of private wells and cisterns, which are still maintained to some extent as sources of water supply for individuals throughout the city. The board of health of the city of Columbus is making an honest effort to bring about the abandonment of such private sources of water supply, and the general utilization of the public water supply of the city. It is quite probable that a large percentage of the typhoid fever now occurring in the city of Columbus is the result of the use of impure water obtained from private wells and cisterns. With complete abandonment of these sources and substitution of the public water supply of the city, we may reasonably expect an almost entire elimination of typhoid fever. It behooves every citizen maintaining a private well or cistern to respect the advice and orders of health authorities, and by using the public water supply to secure for himself and his family the greatest benefits which are thereby offered.

In spite of the adequate sewerage facilities in practically all portions of the city there are still maintained, in violation of the law and of the advice and orders of health authorities, a large number of privy vaults and cesspools. The existence of such insanitary devices is no doubt responsible for the occurrence of much disease in the city. Every property owner who maintains a privy or cesspool on a property to which a sewer is available, should abandon such device and establish a sewer connection thus securing a share in the advantages of proper sewerage which have been provided by the city.

With respect to the proper collection and disposal of garbage, the citizens of the city have an important responsibility in the success of the system. It is important that garbage be removed promptly, after it is discarded by the householder, but the city is unable to make collections more frequently than once or twice each week. Unless the material is properly kept during the interval between collections, odors will result and the opportunity for fly production will exist. The city officials have, therefore, ruled that the householder shall provide a tight metal receptacle for garbage, and it should be considered the duty of every citizen to comply with this regulation. Furthermore, it is important that only garbage be placed in such receptacles, inasmuch as the success of the final disposal system is affected by the presence of foreign material in the garbage.

To summarize the foregoing statements, the city of Columbus at a considerable cost has provided extensive improvements in its public water supply, sewerage system, and methods of disposal of sewage and garbage. These have been installed to better health conditions and for the comfort and convenience of the citizens of the city. It is important, therefore, that all residents of the city utilize the advantages offered and thus bring about the maximum benefits to the city as a whole.

THE POISONS SECRETED BY ANIMALS.

E. F. McCampbell, Ph. D., M. D.
Secretary and Executive Officer, Ohio State Board of Health.

INTRODUCTION.

The field of this discussion will of necessity be limited. It is not the purpose to enter into a detailed discussion of all the poisonous substances secreted by animals or all the animals which are capable of secreting toxic substances. The aim will be, however, to call attention to the various groups secreting poisons, and more particularly to those which have been most studied, namely, the snakes and their venoms. Furthermore, the discussion will be confined to the physiological and pathological aspects of the question and no detailed discussion of the various and interesting zoölogical problems in connection with the subject will be given.

In viewing the field one finds that there are a large number of animals which secrete toxic substances or venoms. Some discharge venoms for the purpose of keeping off enemies who attempt to feed upon them (toads and salamanders), others use the venom with its diastase for the purpose of aiding digestion (certain snakes and one genus of fishes), and still others use the venom for the purpose of killing the prey by either directly inoculating it by means of a bite or sting (most snakes, spiders, scorpions) or by discharging it into the surrounding media where it is absorbed and paralyzes the prey (certain echinoderms and molluscs).

An animal is usually referred to as "venomous" when it possesses the power of inoculating its venom. However, this word "inoculating" should be used in a broader sense.

Animals secreting venoms are found in practically all of the lower zoological groups, such as the *protozoa, coelenterates, arthropods, molluscs* as well as among the vertebrates. Representatives of these groups will receive attention later. The reptilia, among the vertebrates, are perhaps the best endowed with venoms and inoculatory apparatus of any of the animals. This group has been also the most studied as before stated. Snake venoms are in certain ways very similar to bacterial toxins (plant toxins) and in addition are much more stable compounds and therefore can be more easily studied. Very little is known about the exact constitution and immological effects of the various poisons produced by the bacteria, causing our infectious diseases. This is due to the fact that they are very *labile* substances and can not be analyzed by means of the ordinary chemical reagents or by means of physical chemistry. They can be studied with a certain amount of satisfaction by means of so-called *biological analysis,* that is, by the inoculation into animals and the noting of results. Snake venoms being somewhat *more stable* have materially aided the bacteriologist and pathologist in interpreting the bacterial toxins. The proposition is somewhat similar to the study of cancer in mice and rats, in relation to human cancer.

It may be said at the outset that the poisonous and non-poisonous reptiles, particularly the snakes, can not always be easily distinguished. Practically all the snakes inspire dread and have for all time. We find that the snake has and now occupies a very unique position in the world.

In Genesis it is referred to as the incarnation of the evil one, in Greece it was the symbol of prudence and wisdom and in Egypt that of immortality. In ancient Rome various epidemics are reported to have ceased when the snake sacred to Aesculapius was brought from Epidaurus. The Gallas of Central Africa consider the snake the ancestor of the human race. In India the cult of the Seven Headed Naja or serpent-god formerly was as flourishing as that of Buddha. It is now considered among the Hindus, a crime to kill a cobra. It is interesting to note in this connection that the annual death rate from poisonous snakes in India alone is about 25,000.

Classification — The reptilia, which is as you know, one division of the animal kingdom, contain a sub-division called the *Ophida* which includes all snakes. This sub-division is divided into two other divisions

Ophida colubridae — including poisonous and non-poisonous species
Ophida viperidae — all poisonous.

The only distinction between the poisonous and the non-poisonous is the possession on the part of the former of poison glands and fangs or teeth especialy adapted for the inoculation of the venom. Our general interest is perhaps found more in connection with the snakes of our own country although the venoms of these have not been studied to near the extent of those of the tropical poisonous snakes, such as the cobra. The studies in our own laboratory have been almost entirely confirmed to cobra venom.

Nevertheless, a few points in regard to the poisonous snakes of this country and especially of Ohio may be of some interest.

Colubridae — Most all poison species belong to the Family

Elapidae, genus Elaps, sometimes called the coral snake. This is not, however, the real coral snake. The reptile is alternately striped with 25 black and bluish-white rings. It lies in the leaves in the woods and its length rarely exceeds 3 feet. The poison fangs are small and are situated in the back of the jaw, therefore the bite is less dangerous. However, the venom is very powerful and its bite may be fatal to man. It is found in Arizona and other southwestern states.

Viperidae — All venomous — No true vipers in America, although the so-called pit-vipers are common.

Family Crotalinae are divided in to 3 genera — Crotalus, Lachesis, Anceistrodon. Their venom is powerful and they are large and vicious.

1 — *Crotalus* — only in America — horny rings in tail — rattlers.
Crotalus adamatus — diamond rattle snake — 7 ft.
Two species in Ohio. 15 species in U. S.
2 — *Lachesis* — Fer-de-lance, Short, sugar planters are annoyed.
Horny tail — no rings.
3 — *Anceistrodon* — water moccasin, copperhead, venom powerful.
Copperhead in Ohio.

POISON ORGANS.

Poison Fangs — The poison fangs of the venomous snake are in fact hollow or grooved teeth supplied with a canal or furrow running all along the length of the tooth. These fangs are immovably attached to the upper maxilla. They are covered and hidden by a fold of mucus membrance called the *gingival membrane.* This membrane also hides the reserve fangs which number from two to six, and in case the mature fangs are damaged or shed they grow out in place of them. The upper maxilla of the snake is quite movable. When this is drawn backward it erects the fangs in a vertical position. Otherwise, when they are at rest, they lie in almost a horizontal position. At the same time that the upper maxilla is drawn back and the fangs erected, when the snake strikes, a special constricter muscle contracts and squeezes the poison glands, the secretion emptying from the excretory ducts of the glands directly into the canal of the fang. The opening of the duct of the poison glands does not meet the opening of the canal of the fang, unless the latter are in an erect position. It is, therefore, impossible to extravasate the venom with the fangs in a horizontal position. The size and the shape of the poison fangs vary with the snake. Among the true vipers they are long, curved and inflict a very deep wound. In others, such as the Elaps and the sea snakes they are short. On account of their inability to inoculate the venom, these latter snakes are less dangerous, but notwithstanding this, their venom is much more powerful than those having longer fangs. The poison fangs very often reach the length of one inch. Peculiarities in fangs are of importance in determining species of snakes.

Poison Glands — The poison glands of snakes are very similar to salivary glands. They are located in a wide space between the muscles below and behind the eyes on both sides of the jaw. In the cobra, which is probably the best known poisonous snake, the glands reach the size of the ordinary almond. The gland itself is covered by a capsule and the fibres of the masseter muscle pass into the glands. The venom accumulates in acini of the gland and collects in a small sac, which is in fact, a dilatation of the mucous membrane of the duct. The walls of this sac also contain muscle fibres and serve as constricters for the opening of the duct. The non-poisonous snakes as well as the poisonous ones possess sub-labial and parotid glands. The sub-labial glands in certain of these species secrete a venom, but these snakes have no inoculatory apparatus and consequently are not dangerous. The venom in these cases seems to be indispensable for digestion.

The Secretion of the Venom by the Gland Cells — The secretion of the venom takes place in what may be called two phases. First, the development of the cell nucleus and second, the action of the cell protoplasm. *"Venogen"* granules are produced from the nuclear chromatin. The transformation may be followed by staining reactions. Exosmosis of the dissolved nuclear substances occurs forming stored *"ergastroplasmic"* venogen. The nuclear membrance takes an active part in the secretion of both these forms of venogen. Venogen granules and stored venogen disappear during the physiologic activities of the cell. These venogen granules are basophilic and are changed into venom granules which are eosinophilic or acid.

Discharge of the Venom — The act of striking consists in drawing the head back, opening the mouth wide, erecting the fangs to vertical, and exposing them by drawing back the gingival membrane. The snake usually strikes quickly and immediately draws back the head. At the moment of striking the jaws are closed and the glands, together with the venom sacs and excretory ducts are compressed forcibly and the venom comes out in a stream. The muscles concerned are the masseter, temporal, and the internal and external pterygoids. The amount of venom thrown out varies with the size of the snake (sea snakes are an exception). The cobra usually throws out about .2 of a gram.

Physiological and chemical properties — Venoms are viscid fluids which vary in color from a pale amber to a deep yellow. Those from various snakes look very much alike in a fresh state. The pigment present varies with the species of snake. Repeated extraction causes a decrease in the amount of venom, and also in the color. Dried venom cracks into yellow particles which resemble crystals. Floating bodies are always seen in fresh venom. These particles are ovoid, granular, refractile and are albuminoid in nature. In addition to these, a few epithelial cells, fat globules and leucocytes occur. The specific gravity of venom varies from 1030 to 1070. The specific gravity is lighter in crotiline venom. The amount of water present varies from 25 to 80 per cent. In the rattlesnake it is about 33 percent. Venom is usually faintly acid but there is always a slight variation in reaction in different venoms. Venom contains the chlorides and phosphates of magnesium, calcium and ammonia.

The chemistry of venom is not entirely accurate. Bonaparte in 1843 described a protein in venom which he called *viprin*. Bush later thought that this protein was a *ferment* similar to ptyalin of the saliva and Fayrer in 1873 thought it *ptomain*. Weir Mitchell in 1886 isolated three proteins from venom. Two were soluble in water and one insoluble. Of the two soluble in water one was coagulable by heat, non-poisonous and was called *venom-albumen*. The other was not coagulable by heat, was poisonous, and was called *venom-peptone*. The insoluble protein was known as *venom-globulin*. Mitchell assigned the edema, putrefaction and necrosis of tissue which occurs in snake venom poisoning to the action of venom-peptone. He assigned the respiratory symptoms and those changes taking place in the circulatory system, such as hemorrhage from the capillaries, coagulation of blood, etc., to the action of venom-globulin. Later workers have found no trace of peptone in venom. Venom may be precipitated by absolute alcohol. It gives practically all the protein reactions such as Million's, xanthroproteic and biuret. It remains stable for many years when dried. Cases are on record where cobra venom are kept from 15 to 23 years without any deterioration. Venoms vary in their resistance to heat, being usually destroyed from 80 to 100° C. Some, however, are not destroyed until a temperature of 120° C is reached. Freezing has no effect upon it. Dialysis is exceedingly slow. Reflected sunlight does not influence venom but direct sunlight produces a slow deleterious effect. Electricity destroys it as do also radium rays. Various chemicals such as permanganate of potash, chloride of gold, hypochloride of calcium, chromic acid and saturated bromine water seem to have a special affinity for venoms.

We now come to the most interesting and important consideration of this subject, namely:

THE TOXIC PRINCIPLES OF VENOM.

They are as follows: *First,* that substance which produces instantaneous intravascular thrombosis or clotting. *Second,* that which attacks the nervous system. *Third,* that which produces rupture of the capillary blood vessels. *Fourth,* that which attacks the red blood corpuscles. *Fifth,* that which contains cytolytic or destructive principles for various other body cells. *Sixth,* that which causes the hardening of red corpuscles. *Seventh,* that which causes the loss of bactericidal power of the blood. Not all venoms contain all of these constituents.

The Blood Clotting Component—This toxic component of venom has a marked influence upon the coagulation of blood. Sufficiently large quantities of venom produce instantaneous intravascular thrombosis or clotting of blood within the vessels (positive phase). Small quantities of venom destroy the coagulative power of the blood for a long time (negative phase). A venom containing an excess of this component usually produces instantaneous death. The symptoms are a sudden loss of equilibrium, violent convulsions and death in less than a minute. Post mortem shows thrombosis of the pulmonary veins and right side of the heart.

The Neurotoxin of Venom—When this component is present in the venom in large quantities death usually results in 15 to 20 minutes after the inoculation. In the case of cobra venom which contains some neurotoxin, death results in man in from 4 to 6 hours. We find that animals and man react differently to this constituent of venom. In certain instances the process may be an acute one and in other cases, chronic. In the acute form of intoxication there are no local symptoms except a slight edema, occasionally ecchymosis, stupefaction, paralysis of limbs, twitching of muscles, dyspnoea and cessational respirations. The heart in such cases usually beats for some minutes after respiration has ceased. In the chronic form there are no marked symptoms. Death usually results in 10 to 12 days. There is loss of weight and appetite, great depression, marked weakness and atrophy and extreme emaciation. The neurotoxin of venom acts like curare i. e. on the endings of peripheral nerves. The reflexes may disappear before or simultaneously with the appearance of motor paralysis, and they do not reappear after the use of strychnine. Neither does a preliminary strychnine injection prevent the loss of reflexes. In some cases (rabbits, mice and pigeons) an acceleration may precede the loss of reflexes. Certain venoms also exert a slight action on the motor ganglia of the heart. In warm blooded animals there is a rapid diminution of the blood content of the right heart and there is incomplete contraction, respiration ceasing with the heart in diastole. The histological changes are those of acute degenerations of the ganglion cells. This however, can not be noted except in venoms which do not act too rapidly. For example, it can not be noted in the case of cobra venom poisoning in animals. Chromatolysis and cytolysis are noted in the nerve cells. There is usually an increase in connective tissue and the gray matter of the central nervous system. Histologically the pathologic changes are those of a poliocephalitis or a poliomyelitis. There is also atrophy and paralysis of the muscles.

Hemorrhagic Principles — The most striking effect of viperine and crotaline poisoning is the rapid discoloration and swelling of the site of injury, as well as the profuse bleeding. The extent of this change is variable with the amount of venom injected. Eventually, it usually extends over the side where the bite is located and the half of the body is involved. The change is due to rupture of the capillary blood vessels. In certain venom poisonings, as for example, the rattlesnake, there may be bleeding for several days, followed by necrosis and ulceration of the part. In order to demonstrate this hemorrhagic principle, called by some "hemorrhagin," it is only necessary to put a particle of venom on the membrane, such as the mesentery and immediate rupture of the capillary blood vessels will be noted. There is also some edema, but not as much as in the case of other venoms.

Hemolytic and Hemo-agglutinative Principles — The action of this constituent of the venom is upon the cellular elements of the blood particularly the red blood corpuscles. Hemoglobinuria and hematuria are frequently observed in cases of snake venom poisoning. In order to demonstrate this constituent it is necessary that the blood be drawn and mixed *in vitro* with the venom. Venom itself is an *amboceptor,* like a bacterial amboceptor the *complement* being supplied by the serum of the animal, and in certain instances by the red-blood corpuscles themselves. For example, ox, sheep and goat corpuscles are not hemolyzed by cobra venom, while those of the rabbit, guinea pig, or man, are hemolyzed by the direct addition of the venom to the corpuscles. This means that the complement is supplied by the red cells themselves. Such a complement is called *endo-complement.* Lecithin has been found by Kyes to be capable of complementing venom and combining with it so as to produce a complete toxin. This toxin has been called by Kyes "*cobra lecithid.*" It should be remembered that this constituent of venom does not produce any deleterious effects upon animals not having the complement. In this case the possession of the complement is a deleterious factor to the animal.

Hemo-agglutinins are also present in certain venoms, producing a coagulation of the red blood corpuscles and the thrombosis of the blood vessels.

Cytolytic Principles — Flexner and Noguchi have demonstrated that venom possesses certain substances capable of producing lysis of various cells in the body, such as those of the liver, kidney, testis and ovary. These substances are amboceptors, and the complements are supplied by the various cells themselves.

Protective or Hardening Properties for Red Blood Cells — There are certain venoms, for example, that of the rattlesnake, which in the beginning seem to be hemolytic, then later produce no hemolysis. This is probably due to the fact that an excess of the venom-amboceptor deviates the complement so that none is left to combine with the amboceptor already combined with the cells and thus produce hemolysis. Noguchi has shown, however, that the corpuscles undergo an actual hardening which renders them unable to give up their hemoglobin. Not only are these corpuscles insusceptible to the hemolysin of venom, but also to the tetanolysin and saponin.

Loss of Bactericidal Power of the Blood — The blood serum of most animals and man is naturally slightly bactericidal for certain bacteria. This bactericidal action is due to the bactericidal amboceptors and complement. It is noted that after the recovery from the general and local effect of snake venom intoxication that many animals and individuals have secondary infections with various microörganisms. This is due to the fact that the *complement* for the bactericidal amboceptors has been destroyed by the venom. The fate of the venom in the body is not known. It is probably decomposed and excreted in case of recovery. Perhaps certain constituents are retained.

SYMPTOMS OF VENOM POISONING IN MAN.

The symptoms of venom poisoning in man show themselves both locally and constitutionally.

Local — The local effects are rapidly appearing inflammatory swellings at the site of the bite, ecchymoses and necrosis with or without pain. There may also be some lymphangitis and phlegmon.

Constitutional — The constitutional effects are fever, cerebral and spinal disturbances, especially medullary paralysis of respiratory centers and advancing motor paralysis. Hematuria, hemoglobinuria, hematemesis, diarrhea, vomiting, headache and vertigo are common occurrences. The individual is usually dyspnoeic and the pulse intermittent. Convulsions may occur in the case of certain venoms.

MORTALITY FROM SNAKE VENOM POISONING.

The mortality from snake bites is greatest in countries in which poisonous snakes are most abundant, and where conditions of life favor exposure. In India, as before stated, the annual loss is about 25,000. The mortality is also influenced by the temperament of the snake which influences consequently the degree of danger, a sluggish snake being less dangerous than an active one. Weir Mitchell states that ⅞ of persons bitten by rattlesnakes recover. This is due to the fact that the injury is caused by the lower teeth principally and the fangs are not completely raised. Cobra bites are fatal in 25 to 45 percent of the cases. The depth and locality of the wound also influences the result, the lips, fingers and toes being the most dangerous parts. A large percent of persons die also from the effects of alcohol poisoning, given by some as an antidote for venom poisoning. Such deaths are frequently referred to snakes.

The time of death following the bite varies as before stated, with the snake. In cases of crotalus snakes the average is from two to fifteen minutes. In the case of the cobra from four to six hours; in the case of the lachesis two to four days. In case of recovery the individual or animal very frequently shows various kinds of paraesthesia.

In conclusion in regard to the venoms of snakes, it should be stated that in those countries where they abound, antiserums have been prepared, which have proved themselves to be very efficacious in the prevention of fatal venom poisoning. Such an antiserum is called an *antivenin* and is prepared in a manner very similar to the way antitoxins are prepared. These antivenins are usually made *polyvalent* by using a mixture of venoms of several different kinds of snakes in inoculation of the animal to be immunized.

(*To be continued.*)

A NEW BACTERIAL DISEASE OF RODENTS TRANSMISSIBLE TO MAN.*

WILLIAM B. WHERRY, M. D.,
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Three years ago, while working in the Federal Laboratory at San Francisco on the distribution and epidemiology of plague among the California ground squirrels, McCoy (McCoy, Geo. W.—Public Health Bulletin No. 43, April, 1911) encountered a disease of these rodents which was of particular interest in that the lesions in ground squirrels, guinea pigs, white rats, and gray mice rather closely simulated those due to plague. Infected squirrels were obtained from widely distributed points between Los Angeles and Sacramento. Later, McCoy and Chapin (McCoy, Geo. W. and Chapin, Chas. W. — Jour. Infectious Diseases 1912, Vol. 10, p. 61, and Public Health Bulletin No. 53, January, 1912) published further observations and described the *Bacterium tularense* which they isolated and proved to be the cause of this disease. The extensive experiments of these workers will not be reviewed in detail, as the publications cited can be easily obtained. However, as the virus was extremely pathogenic for certain rodents, they were naturally anxious to determine its virulence for various animals and carried out extensive inoculations. They found guinea pigs, rabbits, white rats, gray mice, ground squirrels (*C. beecheyi*), the gopher (*T. bottae*), the Java and Rhesus monkeys quite susceptible; while the adult Norway rat (*M norvegicus*) was usually immune, the young were only partly resistant; sheep were only slightly susceptible (one out of five). The following animals they found immune: Calf, pig, goat, cat, dog, pigeon.

In a private communication to the writer, McCoy says that owing to the marked virulence of the virus for monkeys they fully expected a human case to turn up sooner or later. Working with Mr. B. H. Lamb, the writer has discovered two cases of human infection with *B. tularense* in Cincinnati. The first case has been reported in detail. (Wherry and Lamb — Jour. Infectious Diseases 1914, vol. 15, p. 331.) This case was in a meat cutter in a cheap restaurant who came under the care of Dr. Derrick T. Vail. He was suffering from an acute ulcerative conjunctivitis, with involvement of the preauricular and cervical glands on the corresponding side, fever, and marked prostration. The details of the clinical history of this case were published by Dr. Vail (D. T. Vail, The Ophthalmic Record, Oct. 1914). The second case was a farmer's wife who came under the care of Dr. Robert Sattler, who will report on it later. She also had an ulcerative conjunctivitis of the left eye, with marked edema, involvement of the preauricular and cervical glands, and marked prostration. The temperature in this case once went to 104° F. Her illness lasted over two months.

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*Reprint — Public Health Reports, 1915.

We were anxious to find the source of infection in this locality and naturally suspected wild rabbits, as these represent the chief variety of wild game sold in the markets. Our attention was further directed to rabbits through the reports of hunters that wild rabbits in Indiana and Kentucky wer dying in large numbers. Through the co-operation of Dr. J. H. Landis, health officer of Cincinnati, we were able to examine two rabbits found dead on the M. farm about six miles from Vevay, Ind. (Switzerland County). Both of these rabbits showed the gross lesions of the disease and were proven by guinea pig inoculations and bacteriologic examinations to be infected with *B. tularense*. It is interesting to note here that Dr. Sattler's case came from a farm in Indiana about four miles distant from the M. farm. Through the further interest of Dr. Landis we are now engaged in testing out some rabbits from Kentucky and Ohio, which are in all probability also affected with the same disease. Hence we are inclined to conclude that this rodent disease is widely distributed and that extensive epizootics among wild rabbits occur frequently.

Further investigation will show whether the disease is transmitted to man frequently or not. While the human cases on record were both individuals who had handled and dissected wild rabbits and were both cases of conjunctivits, it seems possible that infection may occur through less direct channels and that other types of infection in man may occur. On the basis of animal experiments it seems possible that ulcerative rhinitis, ulcerative or membranous sore throat, gastro-intestinal infection, or lymphadenitis secondary to cutaneous infection may occur. Susceptible rodents may be infected by feeding, and by the introduction of infectious material into the eye or nose or upon an abrasion of the skin. Experiments on transmission by contact or association have failed in the case of guinea pigs and ground squirrels, but a recent experiment by Mr. Lamb was successful in the case of rabbits. In this experiment a rabbit, inoculated by placing infectious material in its eye, was kept in a runway with about fifteen healthy rabbits which had been under observation for several weeks. In the course of about two weeks five of the rabbits associated with the sick one died of the disease. We believe this is due to gastro-intestinal infection, as rabbits kept together are very affection-ate and will lick any sore place upon their companions. However, it should be borne in mind that rodent fleas may possibly transmit the disease to man, for McCoy and Chapin, in searching for a natural mode of transmission among ground squirrels, twice successfully transmitted the disease by means of 100 and 500 squirrel fleas, respectively.

Bacteriologic diagnosis. — We have not been able to find *B. tularense* in smears from the human cases. This is apparently due to the fact that here the organism occurs in the coccoid form and is not easily distinguished from the granular, colloidal débris present. In tissue smears from rabbits or guinea pigs recently dead of the disease the organism can be readily found in very large numbers. It never takes up dyes intensely and is demonstrated most clearly by aniline-water, Hoffman's Violet or Gentian Violet. When so stained it appears as rods varying from 0.5 to 1.0 micron in length and less than 0.5 micron in diameter, surrounded by a distinct capsular halo. A few hours after the death of an animal the organisms in the tissues round up into the coccoid form.

It cannot be cultivated upon any of the ordinary laboratory media, even if this contains the blood of susceptible animals. But it can be isolated on the coagulated egg-yolk recommended by McCoy and Chapin. It is more convenient to resort to animal inoculation for a diagnosis than to attempt to grow the organism in cultures, as this sometimes fails even when the conditions for growth seem favorable. Guinea pigs usually die of the disease in about three days and rabbits in from three to six days.

The lesions found postmortem in guinea pigs, rabbits, and ground squirrels are very much alike and are characteristic. At the point of inoculation, e. g. in the subcutis, one finds a dry, yellowish exudate. The congested vessels radiate from this area to the regional glands, which are enlarged, firm, and white on section, and lie buried in the very much congested periglandular tissues. The spleen and liver are congested and hypertrophied and appear speckled with numerous yellowish-white foci of necrosis. The vessels of the heart and thorax are deeply injected. The lungs sometimes show a few small tubercle-like foci of necrosis or more commonly patchy red areas of consolidation.

Prophylaxis. — In the present state of our knowledge concerning the infection of man with this virus it would seem advisable to at least warn those who dissect rabbits of the danger of infection, and to urge an unusually thorough scrubbing of the hands and of any other objects which may have come in contact with possibly infectious material.

EDITORIAL SECTION.

The Ohio Public Health Journal.

Beginning with this issue the name of the monthly publication of the Ohio State Board of Health is changed from the MONTHLY BULLETIN to THE OHIO PUBLIC HEALTH JOURNAL. This change has been contemplated for some time but it was thought desirable to complete the issue of the Monthly Bulletin for the year of 1914 before changing the name. The interest in the Monthly Bulletin of the State Board of Health has grown very materially in recent years. It has long since passed the stage of being a "bulletin", and can be more properly regarded as a popular public health magazine. It has been the aim of the editors to include within its pages material which will appeal not alone to the trained public health workers and officials, but also material which would serve to interest the laymen. Furthermore, it has been the aim to make the periodical educational in every particular, as this is the prime purpose involved in its publication. It has served a very useful purpose in the campaign of public health education which is being carried on by the State Board of Health. We believe that the solution of practically all our public health problems rests in the proper education of the people in regard to these matters and the growth and development of an intelligent and thinking citizenship. Ample evidence is at hand to justify the publication of this magazine. Criticisms from individuals both within and without the state of Ohio seems to indicate that it is accomplishing its purpose. The editorial board desire to make the journal still more useful.

The first publication of this kind, issued by the State Board of Health, was a monthly known as the MONTHLY SANITARY RECORD, begun in 1888. The MONTHLY SANITARY RECORD was issued for six years, and was followed in 1895 by a monthly known as the OHIO SANITARY BULLETIN. In 1909 the quarterly Bulletin of the Ohio State Board of Health was issued. This periodical became a monthly publication in 1911 and at the beginning contained from 16 to 32 pages. During the last two and a half years the publication in response to public demand has grown until now the average issue is about 150 pages. The Ohio Public Health Journal will be issued monthly and will contain from 100 to 150 pages. Two volumes will be issued during the year, one from January to June, inclusive, and one, from July to December, inclusive. The editorial board welcomes constructive suggestions from all interested persons. It is the desire to make the periodical meet the public demands as nearly as possible.

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Methods and Channels of Infection.

Beginning with this issue the Secretary and Executive Officer will contribute to this publication a series of articles from month to month dealing with the general subject of *Methods and Channels of Infection*. This series will be followed by another on the general subject of *Immunity and Susceptibility*. These articles are presented in response to a rather extensive demand on the part of quite a number of individuals who are interested in the general fundamentals of these subjects. The articles will be semi-scientific in nature and it is hoped that they will be read with profit by all those interested in these subjects both from the scientific and popular sides. The two series of articles were written primarily as a contribution to the second edition of a book on *Microbiology*. This edition has not yet been published, owing to the fact that certain contributors to the volume are now isolated because of the European war. *Microbiology* is edited by Professor Marshall of the Massachusetts Agricultural College and is published by P. Blakiston's Son and Company. This book, which treats all phases of the subject including the public health aspects of the various questions involved, is heartily recommended to all health officers, educators, and laymen interested in securing a comprehensive knowledge of the field of sanitary science. The proposed series of articles by the Secretary are printed through the courtesy of the publishing company, which holds the copyright.

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A Series of Articles Upon Industrial Hygiene and Occupational Diseases.

Among factors which are causing disaster in the onward march of civilization, there has been brought to light, in the last half century especially, the subject of occupational diseases, which appear to be due to attempted or forced adaptations to unnatural environment.

Beginning with this issue, there will appear in the successive monthly issues of this publication a series of articles taken from the report of the State Board of Health's "Survey of Industrial Health-Hazards and Occupational Diseases". This Survey has been made in conformity with the request of the 80th General Assembly of Ohio. Dr. E. R. Hayhurst, Director of the Division of Occupational Diseases, writes these articles which are to appear in a double series.

One series will begin with Part 1, of the Survey and continue until the first four Parts have been published. The second series will begin with the industrial hygiene of industries and trade processes themselves, taken from Parts V. and VI. of the Survey. As mentioned, the two series will run simultaneously, about ten to fifteen pages being devoted to each series each month. It is proposed by this arrangement to give the subject-matter, consisting of the information which has been collected and summarized, the wide distribution which the publication of the State Board of Health enjoys.

The first series will show the basis for the survey, the principles used in conducting it, and the extent of the industries and the processes of interest, in the State. The second series will begin with three articles, "Factory Processes, General", "Gas Producing", and "Stationary Firing and Engineering", after which will be taken up in logical order, and from a health conservation aspect, the various general manufacturing processes, such as "Furnacing", "Forging and Blacksmithing", "Iron Founding,,' and so on. There are some forty of these general processes which may be found in connection with almost any industry. After these have been exhausted, analysis of the special processes in connection with some fifty industries, such as "Printing", "Laundering", "Rubber Manufacturing", "Pottery", and "Glass Manufacturing", will be published.

The Survey has been conducted according to a definite plan by a staff of physicians and hygienists who have investigated the working conditions and methods in 1,040 establishments in the State in which a total of 235,000 wage-earners were employed at the time of investigations. The Survey has not been limited to large cities, since the list of places visited includes eighty-one cities and villages in the State. Manufacturing pursuits are the ones chiefly covered, although some attention has been given to certain non-manufacturing pursuits known to be associated with definite hazards to health. The same system of hygienic analysis has been applied to each industry and process investigated, and it is believed that a sufficient number of places have been covered under each heading to afford a fair estimate of general conditions of work in connection with each such industry or trade process. Intensive studies have not been attempted, nor has the whole field by any means been covered, but it is believed that the principal features have been surveyed which underlie the vast amount of unnecessary sickness and shortening of life which exists in connection with industry.

The Role of the Public Press in Health Work.

With the New Year, it seems fitting that we should not only keep our plans for the future in mind, but also carry with us those things, from the accumulated experience of previous years, which have been of value in our work.

Among those things, which we count of untold value in our public health work, is the generous and universal support of the daily and weekly press of Ohio. It seems to us, as we look back over the year just passed, that we have never had such co-operation from the editors as we have experienced in 1914. It is true that we have perhaps learned to adjust our educational work so as to better harmonize with the conditions and demands under which the newspapers of the state are surrounded. Nevertheless it has been a continuous satisfaction to the state and local public health workers to know that the resources of the most powerful organs for reaching the people are ready and willing to promote the plans which are made for the improvement of the health of the individual and the community.

If we accept the premise as true,—and who does not accept it today,—that the prevention of disease depends upon a widespread knowledge of the causes and manner of spread of diseases, we can readily appreciate the important role of the public press in our public health work. We trust our plans will always be based upon real facts and conditions, so mingled with commonsense that they will continue to appeal and evoke the ready support of the newspapers of Ohio. If the past is in any way an indication of the future, we believe the campaign for the prevention of disease will continue without abatement and with increasing momentum. And the public press will have a large share in the results.

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Public Health Legislation.

Quite a number of bills affecting the public health work in the state will be introduced during the present session of the Eighty-first General Assembly of Ohio. The majority of these measures emanate from the various state departments interested in public welfare, as well as from voluntary social and medical organizaations, having for their purpose either directly or indirectly the conservation of the public health. Several of the bills which will be introduced have been prepared in the State Department of Health. They are the results of many years of careful study and observation. They aim to work no injustice on any man, woman, or child but to lengthen the span of life and to increase happiness. They seek to correct certain well known defects in the system of administering public health affairs in this state and to create more ideal sanitary conditions. They are creatures of no particclar sect, creed, or class, but propose to accomplish on the whole just one thing, namely, the improvement of general living conditions which will eventually make the commonwealth of Ohio one of the most sanitary sections of the country in which to reside. Without doubt these measures, which have been drafted only for the public good and which in all instances are sound and economical, will be attacked from various sources. The representatives of the various cults, and those desiring special privileges in order that they may prey upon the people, will probably allign themselves against this constructive legislative campaign for more ideal health conditions. Against the contemplated bills will be found those interests which seek to practice medicine when they are not sufficiently qualified; those who wish to foist fake cures for the various diseases upon the seemingly unsuspecting public, including the quacks, patent medicine vendors, and the like; and also, certain of the few remaining unscrupulous members of the public press and ignorant laymen who are members of organizations desiring so-called "medical freedom."

In favor of these measures, which will operate only for the general advantage of the public, will be found all those thinking and conscientious citizens of the commonwealth. Public interest in the various health problems of the state is increasing. The public is demanding that attention be given to these matters. Something must be done to eliminate the preventable disease and sickness which occurs in this state.

In the December issue of the MONTHLY BULLETIN attention was directed to the organization of the Ohio Public Health Federation. As was pointed out, this organization was formed for the promotion and the systematization of a joint campaign for the conservation of the public health of Ohio. The co-operating organizations include, beside the various state boards interested in public welfare work, the Ohio Society for the Prevention of Tuberculosis, the Ohio State Medical Association, the Homeopathic Medical Society of Ohio, the Ohio Eclectic Medical Association, the Ohio State Dental Society, the Ohio Veterinary Medical Association and the Ohio State Pharmaceutical Association. In all, 8700 members are represented. Each organization will have a representative in every county, and there will be a representative of every organization in Columbus. The committee in Columbus is known as the Executive Council of the organization. All the local representatives will be informed as to the progress of legislation along public health lines. These local representatives in the several sections of the state are very important factors. It will be their duty to keep in touch with members of the Legislature whom in most instances they know intimately. The members of the Legislature will in all probability not be approached by the representatives of the Executive Council for the purpose of influencing legislation along these lines. Every proposition will stand on its merits. The working out of the plan depends in a large measure upon the local representatives. The members of the Legislature must be kept well informed as to the exact content and meaning of the various bills which are introduced. The Federation will also pass upon all public health bills from all sources which are introduced and which show on analysis to be or not to be for the public good. The organization is entirely a voluntary one and will work as above stated for just one purpose, namely, the protection of the people.

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The Poisons of Animals.

The poisonous substances which affect man and animals are derived from various sources. It is rather difficult to exactly define a poison. All the definitions that have been proposed are open to some criticism. A poison may be popularly defined as, *a substance which in small amounts is capable of producing serious injury or death when taken internally in a healthy body or when absorbed or assimilated by a healthy body, whether introduced into the tissues internally or introduced from without.* It may be here stated that there is no substance known which is soluble in water that may not produce serious injury or death in a healthy body when taken in sufficient quantities. In defining a poison it is not necessary to specify that it should be taken into the body in small amounts, although those substances which produce serious injury and perhaps death in small amounts, are the substances which are popularly known as poisons. There is no substance known which is inherently a poison. All substances must be taken into the body in sufficient amounts to produce poisonous effects. Poisons may be roughly classified in three general groups, viz: corrosive, irritant, and neurotic. For example, the mineral acids, such as sulphuric, nitric, and hydrochloric and the alkalies, such as ammonia, sodium and potassium hydroxide are examples of corrosive poisons. The irritant poisons act principally upon the gastro-intestinal tract. Arsenic and the organic toxins produced by the microörganisms causing dysentery are examples of this class. The neurotic poisons, as the name indicates, act primarily upon the nervous system and include such plant toxins as strychnine, belladonna and opium and such bacterial toxins as those produced by the bacilli of tetanus and diphtheria. Poisons may also be classified as organic and inorganic. The organic poisons may be further classified into those produced by plants, known as the phytotoxins, including the bacterial toxins, and zoötoxins which are produced by animals. The plant and bacterial toxins have been the most studied of any of the poisons.

Poisons may be produced inside and outside the body. Those actually formed inside the tissues of the body are known as endogenous and include such substances as uric acid, fatigue toxins, and the like. Poisonous substances may also be produced within the cavities of the body, such as in the throat or intestinal canal or in certain localized areas, which on absorption by the tissues produce poisonous effects. This is true of certain bacterial toxins which may be generated at one particular part in the body and on being carried to the lymphatics or blood streams may affect remote tissues. (Ex. diphtheria and tetanus). All the above may be regarded as endogenous poisons. Those poisons which are produced outside the body are known as exogenous. The majority of the plant toxins belong to this group, as well as the mineral poisons and the ptomains, which are split-products of proteins formed during the disintregation of certain of these substances.

Poisons act differently on different persons or animals. There are certain animals which are not affected at all by certain poisonous substances which are extremely toxic for other species. Also, within the same species there is considerable variation in the effect of poisonous substances. For example, straw-berries, eggs, and the like, are very poisonous to certain individuals. Again, poisons act differently according to the age of the individual or animal, the size, and whether or not the individual is normal or suffering from some disease. Other influences, such as the avenues by which the poison enters the body, produce a somewhat different effect. Ordinarily poisons introduced through the lungs produce a more pronounced and rapid effect upon the body than those introduced through the skin either subcutaneously or cutaneously, or through the stomach or intestines. The corresponding effect is in accordance with the order above named. Poisons carried in the blood or lymph are in most instances particularly active. This is especially true when the poisons are produced in the tissues of the body.

It is possible for man to establish a habitation or toleration for certain poisonous substances. The morphine, cocaine and arsenic habitues are examples. Furthermore, the snake venoms and certain other animal toxins can be tolerated after an individual is immunized by repeated small doses. Among the animal toxins or poisons, the snake venoms are perhaps the most interesting and have been the most studied. Sometime ago in the course of an investigation, the Secretary and Executive Officer had occasion to look up the subject of animal poisons. The investigation proved quite interesting, and while not made absolutely complete in its last analysis, it gives one a fairly comprehensive idea as to the poisons secreted by animals. A paper on this subject is printed in this issue and it is hoped that it may be interesting and instructive. The public health aspects of poisons produced by animals are not particularly prominent or important but the subject has a general bearing on this field of work.

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Courses in Public Health.

Courses in public health and preventive medicine are becoming increasingly popular and correspondingly numerous throughout the United States. There is a popular demand for well-trained and efficient health officials. The knell of the political appointee in health organizations has sounded and efficiency is now the keynote. Better still the stipend is becoming more nearly adequate and the compensation is now almost equal in many instances, to that bestowed upon officials in other professions. The new forms of municipal government, for example the commission, or business manager form, have also given impetus to the movement for efficiency in public health work, for where responsibility is centralized, those who bear this responsibility insist upon capable and experienced lieutenants in the various departments under their direction. What might be called the administrative cabinets in municipal and state government, composed of the heads of the various subsidiary departments, are recognized as incomplete without the public health official. To summarize, the need for efficient public health service is recognized, more nearly adequate provision for compensation is being secured, and a corresponding demand for competent health officials exists. What provision have we in Ohio to meet this demand? In the first place, there are a considerable number of persons who have served the public as health officers, and whose qualifications thus acquired entitle them to recognition on the eligible list. Their number is lessened, however, by the fact that a majority of them are physicians who have spent only part of their time in the actual work and whose connections and practice do not justify them severing their affiliations and taking up health work on a whole time basis. Those who are not physicians have not as a rule qualified themselves for the work. Including even those above mentioned, it is evident that the supply of competent well-trained sanitarians will fall short of the demand in a short time. The public has been aroused by the written and spoken word to a realization of the importance of public health work. It will be disastrous to the cause of public health to fail to strike when the iron is hot. To realize the best results from the campaign that has been waged throughout the country, the supply of competent officials must not be lacking when the demand has been created. How is this to be done? In Ohio, by a very felicitous arrangement the Ohio State University and the State Board of Health possess an unofficial but none the less binding cooperative arrangement. These bodies are most suited to give instruction in preventive medicine, the former because of its instructional facilities and the excellent department of medicine it controls, and the latter because of the practical problems in public health work it is daily called upon to solve. Not only must a course in public health and hygiene be available, and this has already been provided to medical students, but a degree denoting special study along this line should be a part of the routine graduate school work. In other words, while it is necessary to establish courses in public health for those intending to be physicians, it is imperative that those who are the paid guardians of the public health should possess more than this. A degree of Doctor of Public Health or some equivalent degree should be the reward of those who spend certain periods of graduate study, say two years, in this subject. These degrees, if the standard is set high and there maintained, will be recognized by the public and physicians, and will render the bearer eligible to appointment as a qualified guardian of the public health. Should such a course be offered by Ohio State University we feel sure that many would take advantage of the opportunity and enlist in this social service movement. Our knowledge of preventive medicine has increased ten-fold within the last decade; the people have been aroused to the value of public health work, and there remains only the task of reorganizing the machinery of prevention in the state. This is the critical moment, and the future of health work in the state depends upon our ability to utilize this golden opportunity to the uttermost. The state university is supposed to lead the public, to minister to its needs, and to conserve the public health and wealth. In no better way can these things be accomplished than by furnishing to health districts, officials whose knowledge of preventive medicine is modern and practical, not ancient and political.

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Private Water Supply Connections.

During the past two or three years the dangers incident to cross connections, which exist between private water supplies of a polluted character and the public water supply, have been forcibly brought to the attention of the State Board of Health. Several serious typhoid epidemics in Ohio have been directly traced to such connections. Not alone are these troubles being experienced in Ohio, but also in many other communities, and the attention of public health officials and water works men has been called to the dangers incident to such connections by different public health and water works organizations. The Division of Sanitary Engineering of the Ohio State Board of Health has been compiling information concerning such installations and is to present a paper upon this subject before the conference of local health officers on January 27 and 28, 1915. Many opinions have been expressed as to the liability of polluting the public water supply by such connections, and many experts have expressed opinions, which would eliminate industrial connections. Several schemes have been suggested whereby the public may be more or less protected against the dangers of pollution from such sources. One of the main reasons for the installation of industrial connections is to provide more ample fire protection for the industrial establishment. It is true, however, that the public health is of greater importance than economy to any individual, and under no circumstances should a connection between a polluted source and a general water supply be permitted whereby the health and lives of the people might be endangered.

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The Narcotic Drug Habit.

Evidence is being brought forth which seems to support the contention that the use of narcotic drugs of various kinds is increasing in this country. It is scarcely conceivable that this is true, especially since there has been for many years much popular education along these lines, and much has been achieved in the abatement of the drug habit through the establishment of institutions for treatment in all parts of the country. The subject of the abuse of opium and its derivatives, such as morphine, codine and heroin, as well as the detrimental effects of chloral, cocaine, and the like, have been much written about.

The subject of narcotism is at the present time being investigated in many states. A great many states have rather effective laws controlling the sale of narcotic drugs. Ohio has one of the most stringent laws in this country on this subject. In all states, however, there are many factors which operate to make the enforcement of the various laws difficult. We are informed that the drug division of the Agricultural Commission of Ohio, which has the enforcement of narcotic laws in this state has met many obstacles. It is fair to say, however, that this Commission is doing good work in cutting down the indiscriminate sale of these products.

The question naturally arises in the minds of thinking people as to what causes are concerned in the making of a drug addict. A careful investigation shows that a large number of men and women become addicted to these habits after having been treated for various internal disorders by physicians and not infrequently by nurses. Unscrupulous physicians and nurses may be justly charged with being responsible for a certain part of the narcotism which exists among our people.

Another factor operates, and if recent information is to be regarded as authentic, it is a very powerful factor. We refer to the rather universal use of patent medicines containing narcotic drugs. Notwithstanding the propaganda which has been waged against quacks and patent medicines in this country by reputable physicians, the public press, and the various social organizations, it must be admitted that this campaign has only borne decided fruit in certain sections of the country and has resulted only in the abandonment by the public in these sections of certain of the dangerous patent medicines. The campaign has also without doubt generally limited the use of these products. It has been shown that if a patent medicine containing a narcotic drug is taken continuously for one or two months' time, that a drug addict can be made out of almost any person. It is true that while a certain proportion of the users of these types of patent medicines stop their use, it is also true that a still larger proportion still continue to use them feeling that they are absolutely essential to their daily life. Many persons are drug addicts and do not know it. A certain proportion of the users of narcotic patent medicines stop the use of these medicines and turn to the use of the narcotic drug which the medicine contains. According to the United State Pure Food and Drug Act, which requires the printing on the label of the bottle the amounts of narcotic drugs contained therein, it is very easy for a patent medicine user to learn the drugs in the preparation.

China has done much within recent years to regulate the opium traffic. It is stated on reliable authority that the opium held up by the regulatory measures in China is unloading itself on the United States. This product and its derivatives are being consumed more than at any time previous according to the testimony of those who have carefully investigated the matter. These investigators tell us that there are at least four million users of opium and its derivatives and cocaine in the United States. Various narcotic drugs seem to be used in varying proportions in different sections of the country, and by different classes of people. For example, cocaine is the favorite drug of the negro. Morphine and other habit forming drugs are used by this race also. Drug addicts among people of this race form a big public health problem, especially in the South. Heroin is used in certain sections of the country rather extensively by young people. In certain instances this habit has been noted among the students in our public schools. There has been one such case in one of the cities of Ohio. Strange enough the use of narcotics is quite prevalent among those individuals who know more than any one else about their effects. A certain proportion of physicians and nurses are addicts.

The problem has grown to such a proportion that our national public health organizations have taken cognizance of the situation. The American Public Health Association, recently in session in Jacksonville, Florida, passed a resolution calling for the appointment of a committee to make a survey of the habit-forming drug situation throughout the country, with a view to recommending state and national legislation. The committee will seek to secure the coöperation of the public press and will aim to furnish the various reputable publishers with accurate information in regard to the contents of the various patent medicines and the general effect of narcotic drugs upon the social life of our people. Attention has been directed to the fact that in many states rather stringent regulatory measures have been adopted. The results have been that a large number of drug users have been prevented from getting their usual supply and as a general consequence these individuals have been left without any consideration or protection whatever. This is not right. The state should make some adequate provision for caring for these unfortunates, many of whom have acquired the drug habit through ignorance. Certain of our state institutions should be opened up for the care and treatment of this unfortunate class.

In conclusion there is just one phase of this important problem which should be mentioned. There are certain drugs which have an immense private use, the effects of which have been generally overlooked by the public at large. We refer to such drugs as aspirin, acetanalid, veronal, sulphonal, phenacetin and the like. They have been termed in general the "headache drugs." They are good and very efficacious remedies when properly used, but the people have little idea as to their exact nature. They are free from danger when properly used and will relieve pain, headache, neuralgia, etc., in many instances. However, their indiscriminate use can only result in the formation of a habit. A certain proportion of the people have learned and know that thse drugs will relieve pain, for example, and they are resorted to by them when a physician should be consulted. Pain is but a manifestation and a symptom of some disturbance. Pain may be due to a great variety of disorders. It is obvious that an investigation should be made to determine the cause of pain before a remedial agent is given. There is evidence which supports the statement that indiscriminate use of these so-called "headache drugs" by many habitues has resulted in the covering up of serious organic disturbances, which if taken in time might have been properly and scientifically handled. There is further evidence that the continued use of these drugs gives rise to certain toxic irritations in various parts of the body, which in cases where the irritation has been prolonged have been the seeming cause of malignant disease.

The time has come when the people should be educated in regard to the use of these drugs, as well as the well known habit-forming drugs mentioned above. Let us not forget that we have ample evidence that narcotism is a big problem in the State of Ohio.

* * *

Ventilation Problems.

It has been generally recognized that pure air is of great importance. Much study has been given the problem of ventilation by various experts. Investigations have in most instances centered around the point of securing a sufficient supply of pure air. For many years it has been the custom to regard the amount of carbon dioxide in the air as the best index of its purity. It has been thought necessary in a perfect system of ventilation to introduce directly from without, at intervals a sufficient supply of air. It was assumed that this air contained all the ingredients necessary for normal life and existence.

Recent investigations along these lines, however, have served to modify our views in regard to the general subject of ventilation quite materially. It seems to have been demonstrated that the amount of oxygen and carbon dioxide in the air, within ordinary limits, of course, has no particular effect upon the general problem of ventilation. The proportion of this product in the air may however be taken as an indicator of the degree of purity. As to the bacteria in the air, it seems to be agreed that inasmuch as, according to our present day ideas aerial infection rarely occurs, this factor is not of great consequence. It should be noted, however, that unventilated rooms with a high bacterial content are most certainly not as desirable for life as a ventilated room with practically no bacteria, even though in the first instance the bacteria may not be absolutely injurious in themselves.

As regards the matter of the presence of odors, it may be stated that they have no direct effect upon the health of the individuals coming in contact with them. It has been agreed, however, as Kimball in a recent article states, that they should be eliminated for esthetic and psychic reasons.

The ordinary dust in a room apparently has little effect upon the health of the individual. However, there are certain occupations which are closely associated with dust formation and in which the dust certainly does exercise a deleterious effect upon the health of the individual. The removal of dust during the process of ventilation is highly to be desired, both from the standpoint of health as well as esthetics. What then is to be expected if a perfect system of ventilation is to be provided. According to the latest information, aside from the proposition of removing bacteria and dust, it would seem that the most important propositions to be considered are the temperature and the humidity of the air and whether or not the air is kept in motion.

In the most improved systems of ventilation the air coming into the building is washed to remove the dust and bacteria. By the most effective processes 54 per cent of the dust is removed and about 64 per cent of the bacteria. Recent practices also include the rewashing of the air which is already present in the building, that is, instead of drawing the air from the outside it is drawn from within the building. This has produced very satisfactory results. The process does not remove the carbon dioxide from the air. It has been shown that rewashed air of this character is cleaner than unwashed outside air and only slightly less clean than washed outside air. There are certain practical phases to this question. It is much more economical to use actively moving rewashed inside air of proper temperature and humidity in a system of ventilation than it is to supply, for example, a sufficient quantity of chemically pure outside air, free from dust and bacteria at a proper degree of temperature and desired humidity and to keep this air in motion. This is very costly and in the light of our recent information can be regarded as impracticable. Pure air contains approximately 21 per cent oxygen and this amount is rarely reduced below 20 per cent, even where there is no ventilation at all and where there is considerable crowding. The oxygen value can be reduced to at least 17 per cent before any deleterious effects are noted from this source. Furthermore, air contains about 0.04 per cent of carbon dioxide. This may be increased to at least 1 per cent without producing any detrimental results. 0.06 per cent of carbon dioxide is regarded as a standard for pure air. Under the most unfavorable conditions the carbon dioxide in crowded and unventilated rooms never reaches 1 per cent. To what then are the generally ill effects noted in crowded rooms due? These effects, as we all know, are sleepiness, dizziness, restlessness, and in some instances headache and nausea. Physiologists tell us that these phenomena are due to heat retention only. This can be obviated by maintaining a proper temperature and humidity in the room and by keeping the air in motion. The temperature should be 68 to 70 degrees F. and the humidity should be about 60 per cent.

Briefly then, the most efficient and economical system of ventilation provides reasonably pure air, partly free from dust and bacteria with an oxygen content from 17 to 21 per cent, a carbon dioxide content of 0.04 per cent to 1 per cent, and a temperature of 68 to 70 degrees F. Above all it is quite necessary that the air be kept in motion as this together with other factors serves to facilitate normal heat radiation from the body.

There is much need for popular education among all classes of people in Ohio on the problems of ventilation. All systems of ventilation in private homes, schools, workshops and public buildings should take care of the above mentioned important factors.

* * *

Chemical Closets.

For premises to which a water supply and sewer are not available, the problem of disposal of excreta is solved with difficulty. The prevailing method, by the use of outdoor privies, is unsatisfactory and detrimental to the promotion of sanitation and public health. In most cases these privies are not provided with a watertight vault, and soil pollution results.

In an effort to improve sanitary conditions and permit the abandonment of the privy ordinarily used, the so-called chemical closet has been proposed. In construction the chemical closet is similar to the privy vault required by the State Building Code, but in its use improved results are obtained by the introduction of a disinfecting chemical intended to deodorize and sterilize the contents. As proposed by the manufacturers and selling agents these chemical closets have not been in strict conformity to the Ohio Building Code regulating privy vaults, the most serious violation relating to the location of such structures. The importance of this matter prompted the State Board of Health to appoint a committee to investigate chemical closets and to report to the Board. In this issue of the Journal the report of the committee is presented.

Chemical closets are to be considered similar to privy vaults in their construction and are differentiated from privy vaults only in the method of maintenance, a chemical being used. It is clear that the same rules governing privy vaults must also apply to chemical closets. The chemical closet is applicable only on premises to which a water supply and sewer are not available. They are not to be used and are not permitted on premises provided with water, and from which water-carried sewage may be disposed of in a sewer. On premises where they are applicable, they must be located in the same manner as is permissible in the case of privy vaults.

The chemical closet has some advantages over the privy vault ordinarily used, in that the use of a chemical brings about disinfection and deodorizes the contents. It is, however, pertinent to observe that the success of the chemical closet is entirely dependent upon the regular use of the chemical in connection with its maintenance. The device is therefore to be classed as being subject to the personal factor, and for this reason universally satisfactory results are not assured.

* * *

Fumigation and Disinfection.

In recent years there has been much debate as to the efficiency of fumigation and disinfection following contagious diseases. Public health workers who have studied the question find themselves divided into schools, one contending that terminal fumigation and disinfection serves a useful purpose in preventing the spread of contagious disease, while the other group maintains that it is of no use whatever and that the only, and, therefore, the most important factor, in the spread of communicable disease, is the direct contact or rather immediate indirect contact. Both schools maintain that concurrent disinfection, that is, disinfection of the secretions and excretions, and the like, during the course of the disease, is one of the most important considerations in working out the effective control of communicable, diseases. Conclusive information in regard to the value of terminal fumigation and disinfection is certainly not yet at hand. The wise and thinking public health official still maintains that until this question is definitely settled, terminal fumigation and disinfection should not be done away with. In certain instances there are many important sanitary procedures which are followed out coincident with the application of terminal fumigation and disinfection. The premises where a communicable disease has existed are very frequently thoroughly renovated, scrubbed and cleaned, trash and refuse of all kinds are disposed of, and as a result much improvement in sanitary conditions is accomplished. Furthermore, there are those who believe that if cleaning and renovating were required absolutely that there would be no danger of doing away with terminal fumigation and disinfection.

A very interesting experiment along these lines on a rather extensive scale will be conducted by the Bureau of Infectious Disease of the city of New York during 1915. It is aimed to dispense with terminal fumigation and disinfection in the borroughs of Manhattan, Bronx, Queens and Richmond. Terminal fumigation and disinfection will be maintained as formerly in the borough of Brooklyn for the purpose of comparison. The public health workers of the country will look forward with great anticipation to the results of this interesting experiment in New York City during 1915. It is quite possible that the results of the investigation of this thoroughly up-to-date health department will go a long way toward settling this much debated question.

* * *

Bathing.

The hygienic and sanitary aspects of the periodic cleansing of the body have been appreciated by many people for years past. Physiologists have investigated at length the effect of bathing upon the functions of the body. The custom of periodically washing the body is practiced to a limited degree in all civilized and uncivilized countries. It is true that in certain sections of the globe the hygienic aspects of the question are lost sight of, and the practice is indulged in largely because of its pleasurable effects. There are many people, however, who pay little or no attention to this well-established hygienic procedure. In certain instances this is because water is inaccessible but in most instances it is due to gross ignorance and general lack of cleanliness. It has been well said that defective sanitation in a community is just another name for defective civilization. It has also been stated with much truth that the degree of civilization which a community has attained is indicated by the attention which is paid by the members of that community to the matters of personal cleanliness. Comparatively few people comprehend the real benefits to be derived from bathing the body. In different parts of the world and among different races of people the matter of bathing is merely a matter of custom.

What then are the results to be desired by washing the body periodically? In the first place, it should be borne in mind that the skin is an excretory organ. Most of the waste materials from the tissues themselves are eliminated from the body through the kidneys and the skin. Obviously, it is very important to the general functional activities of the various organs and tissues of the body to have these waste products removed. The deleterious effects resulting from the retention of the waste products in the body are well known. While the kidneys remove a large part of the products, it is impossible for the kidneys to carry all the burden of excretion. Providing the skin is not excreting actively the kidneys will compensate for this inactivity to a limited degree. Conversely, if the kidneys are not actively secreting, the skin may be made to compensate for this inactivity to a certain degree. It is very important that the skin be kept in a healthy condition and that it be periodically stimulated. A large amount of the excretions from the skin is removed through the process of evaporation. This is, however, not accomplished with great ease in parts of the body where surfaces approximate each other, for example, under the arms, and between the limbs, and toes. The waste material thrown off from the skin at these points rapidly undergoes disintegration and gives rise to noxious odors, which, if they do nothing else, offend the esthetic sense of all persons coming in promixity with such individuals. Furthermore, in certain cases there is considerable disintegration of tissue if these products are not rapidly removed. There are many careless persons who tolerate these conditions, perhaps little realizing how objectionable they are to those in close association with them.

It has long been a custom in many countries, which regard themselves as civilized, for the inhabitants to bathe themselves once a week. A long established proverbial time for this bath is Saturday night after the week's work is done. It is probable that in winter seasons, when the skin is not active, that this weekly bath will serve the purpose fairly well. This is not true, however, in the summer months when the skin is active and large amounts of waste materials are being thrown off through this organ. Of course, it is necessary if weekly periods separate the baths that the body be thoroughly scrubbed, soap being freely used. Most people who bathe weekly use the tub bath which is not particularly stimulating, especially if very hot water is used. The temperature of these baths is usually made from 102 to 110 degrees F. At this temperature, if the bath is prolonged, a considerable amount of body heat is lost. The tepid, temperate, or warm bath is to be preferred. The temperatures to be desired are 85 to 95 degrees F. in the first instance, 77 to 86 degrees F. in the second instance, and 96 to 104 degrees F. in the last. It is probable that the tepid bath of comparatively short duration gives the best results. Warm and hot baths should never be taken, except when the individual retires immediately thereafter. The bodily resistance, due to the loss of heat, is materially lowered and infections may have the opportunity to establish themselves if exposure to cold immediately follows.

Now, what is the best practice from the standpoint of personal hygiene? Most authorities agree that the tepid shower bath of brief duration, taken daily, possesses the most stimulating and most desirable effects. The tepid shower may be followed by a cold shower of a few seconds' duration, and this shower followed by a brisk rubbing of the skin with a rough towel. It is quite true that shower baths are not available to all people and the same may be said of tubs, even when the ordinary clothes wash tub may be used. However, it is quite possible for most individuals to secure at a very moderate cost a large sponge and with a comparatively small supply of water, all the effects of the more modern shower bath may be secured. The practice of daily bathing is growing in favor. Those who follow this practice find that the bodily functions are carried on with greater activity and greater personal efficiency is obtained thereby.

In conclusion it should be stated that the so-called Turkish and Russian baths are not at all necessary for the purpose of maintaining health. In many instances they have been known to produce detrimental results, especially in those individuals suffering from organic disturbances of various kinds. Sea bathing in fresh and salt water cannot be stated to be a healthy procedure. Most individuals indulging in this practice remain in the water entirely too long. The maximum time when the water is warm should not exceed ten to fifteen minutes. After this the results are deleterious. Furthermore, deleterious results come from the almost universal practice of sea bathers lying on the sand for long periods of time. Much body heat is lost by such procedures and the normal body processes are seriously modified thereby.

REPORT ON INVESTIGATION OF CHEMICAL CLOSETS.

INTRODUCTION.

At a meeting held March 19, 1914, the State Board of Health adopted the following resolution:

> WHEREAS, Our attention has been called to the "Kaustine Chemical Closet" advertised as "A Water Closet without Water" and guaranteed to meet with the requirements of boards of health, and
>
> WHEREAS, This closet system contemplates installing a privy within or immediately adjacent to a building, which is contrary to the provisions of Title 18 (Privy Vaults), pages 58 to 62 and drawings on pages 59 and 60 of the State Plumbing Code, and
>
> WHEREAS, Section 82 of the State Plumbing Code, page 39, prohibits the installation of pan, valve, plunger, offset, washout or water closets having invisible seals or an unventilated space or the walls of which are not thoroughly washed at each discharge, and
>
> WHEREAS, The provisions of this section also apply to the dry closet system or other systems of closets in which the venting, back venting, or local venting is to be made otherwise than in this code prescribed, therefore, be it
>
> *Resolved,* That the state board of health disapprove of the practice of using this system in or immediately adjacent to a building used for human habitation or occupancy, and be it further
>
> *Resolved,* That the manufacturers and agents of the Kaustine Chemical Closet be notified that if the aforesaid closet system be installed such installation shall be in accordance with the provisions of Title 18 (Privy Vaults), pages 58 to 62 of the State Plumbing Code.

A copy of the above resolution was transmitted to the Kaustine Company Inc., Buffalo, New York, manufacturers of the apparatus mentioned, and at a meeting of the State Board of Health held July 9, 1914, Mr. H. B. Millward, vice-president of the company, appeared before the Board, protested against the resolution, and explained the manner of construction and use of the chemical closets. The Board voted to refer the matter to a committee consisting of the chief engineer and the state inspector of plumbing for investigation and report. Subsequent to its appointment, the committee received from the Kaustine Company Inc., plans, descriptive matter and endorsements of chemical closets and samples of "Kaustine", the disinfecting chemical used. On October 2, 1914, the committee visited Warren and Niles and examined chemical closets which had been installed in that locality.

REPORT OF THE COMMITTEE.

At the present time there are several firms in various states engaged in the manufacture and sale of so-called chemical closets, devices designed to supplant the unsatisfactory privy vault and applicable particularly in those districts not supplied with sewerage facilities. Among others may be mentioned the Kaustine Private Sewage Disposal System manufactured by the Kaustine Company Inc,. Buffalo, New York, the Hawkeye System sold by The Sears-Roebuck Company, Chicago, The Wolverine Chemical Closet manufactured by the Dail Steel Products Company, Lansing, Michigan, the closet manufactured by The Sanitary Chemical Closet Company, Bradford, Pennsylvania, and the Waterbury Sanitary Closet manufactured by the Waterman-Waterbury Company, Minneapolis, Minnesota. These systems are similar in their main features so that a description of one of them will cover the essential points of interest connected with chemical closets at present manufactured and sold. An exception is the Waturbury Closet which is of the pail type and is installed wholly within a living or sleeping room.

The device manufactured by the Kaustine Company Inc., consists of a bowl of china or enameled iron with a hinged seat and cover resembling in appearance the modern water closet design, from which a so-called dip tub 12 inches in diameter extends downward vertically to a tank containing the chemical solution and designed to receive the fecal matter and urine. A 4-inch ventilator with a connection to the dip tube and to the bowl extends to the chimney of the building or through the roof. The plans and descriptive matter show the apparatus within the building, the bowl being placed on the first floor and the tank on the surface of the ground beneath or in the cellar. One end of the tank is to project beyond the line of the building if possible, and this portion of the tank is provided with a cleaning-out opening 14 inches in diameter. The tanks are constructed of 14 gage wrought iron plate with welded joints to produce water-tightness. The tanks are produced in capacities of 120, 280, 360 and 480 gallons, the smallest serving one bowl and the largest a maximum of four bowls. The price of the installation including tank, bowl and ventilator, ranges from $45 for a single cast iron bowl and the smallest tank, to $200 for four china bowls with the largest tank. In the use of the equipment a chemical containing as its active agent caustic hydrates, is placed in the tank for the purpose of disinfecting and liquefying the fecal matter discharged therein. The charge for the smallest tank consists of 30 pounds of the chemical dissolved in 18 gallons of water. Under average conditions it is claimed that the smallest tank when used by one family will require cleaning and recharging once each year. In this connection it is interesting to note the statement of Rosenau in his work on Preventive Medicine, to the effect that the average production per capita per day of fecal matter and urine is 400 grams and 1,500 to 2,000 cubic centimeters respectively. This is equivalent to about 2½ gallons per day for a family of five. On this basis the smallest tank with a capacity of 120 gallons would serve an average family for only 48 days. It is also important to observe that the success of the system in preventing odors and accomplishing disinfection is dependent upon the use and efficiency of the chemical. It is not assured that the owner of the system will regularly use the chemical required, which fact renders the system open to the objection of not being fool-proof. The company in an attempt to counteract this danger maintains a complete record of systems sold and in use, and endeavors to bring about the regular use of the chemical by correspondence and calls.

As set forth in correspondence and descriptive matter of the company, the chemical closet is intended principally to supplant the unsatisfactory privy vault or privy constructed without a vault. It is the purpose to supply sanitary facilities in unsewered districts. However, in conversation with one of the selling agents of the company at Warren, Ohio, it appeared that the use of the system even in areas supplied with sanitary sewers had been encouraged and permitted. In a communication from the vice-president of the company dated July 31, 1914, it was stated that about 300 systems are in use in the state of New York, of which some 20 to 25 serve public schools. The same figures are given for the states of Michigan and Pennsylvania. A number of installations are also noted in Texas and Iowa. In Ohio an agency has been established under the name of The Kaustine Sales Company, at Warren, and a number of installations have been made in the northeastern portion of the state.

At the time of the investigation of October 2, 1914, the committee examined closets installed by the city of Warren in Packard Park (owned by the city) and by a citizen for his dwelling near Mineral Ridge, a small community south of the city of Niles. At Packard Park the installation was evidently illegally made inasmuch as city sewers are available within the park and in streets nearby. It is probable that in this case the chemical closets were installed for the purpose of economy. The closets in Packard Park were provided with outhouses of cheap construction. They were placed in service about May 1, 1914, and had, therefore, been in use some five months when the examination was made. It was impossible to learn the extent of their use during this period. No odors in the vicinity were observed by the committee. An objectionable condition was observed in the fouling of bowl and dip pipe by fecal matter and toilet paper. The installation near Mineral Ridge was found to be placed in an extension of the dwelling with the tank on the surface of the ground beneath. No objectionable odors were observed at this point. The location, however, was in violation of the provisions of the Ohio Building Code regulating privy vaults.

A sample of the disinfecting chemical known as Kaustine was analyzed in the laboratory of the State Board of Health with the following results:

Caustic hydrates	90.34 per cent
Carbonates	.6 per cent
Volatile matter	3.17 per cent
Iron	.008 per cent

It is evident that the active agents of the chemical are the caustic hydrates contained. With the use of 30 pounds of this chemical and 18 gallons of water, the solution in the tank immediately after it is charged would be 16.42 per cent caustic hydrates. A sample was collected from one of the tanks in the Packard Park installation at Warren, which had been in use for five months. These analyses give the following results:

	Percentages.	*Parts per Million.*
Caustic hydrates	7.68	92,800
Carbonates	4.27	35,200
Volatile matter	16.22	178,880
Iron	.006	70.4
Total Solids	32.08	353,760.
Suspended Solids	6.14	99,680.
Oxygen consumed	.....	7,730
Dissolved oxygen	none	none
Kjeldahl Nitrogen	.366	4,035.
Nitrogen as Nitrites	.001	12.8
Nitrogen as Nitrates	.0035	38.4
Fats	.757	8,346.
Bacteria in one c. c.	none	none
B. coli in one c. c.	none	none

The above analysis indicates complete disinfecting action by the caustic hydrates, but a small degree of oxidation of organic matter to form stable compounds. In other words, no marked alteration of the fecal matter occurs, and it is retained a sterile solution unaffected by bacterial action. The reduction of percentage of caustic hydrates indicates that they react to some extent with the organic matter, and, therefore, it may be expected that ultimately they will become entirely spent. It is likely that with a complete utilization of the caustic hydrates in solution, putrefaction would result, and under such conditions odors would be caused. The disinfecting power of the chemical solution was determined by making a series of trials with 1 per cent, 0.1 per cent and 0.01 per cent solutions. It was found that the 1 per cent solution killed a pure culture of B. typhosus in two minutes. The 0.1 per cent and 0.01 per cent solutions had no effect in 24 hours. These analyses indicate that with the use of the chemical as prescribed in a 16.42 per cent. solution at the start, efficient disinfection is to be expected.

Legislation. Title 18, Ohio Building Code, regulates the construction, location and use of privy vaults. From the foregoing description of chemical closets, it appears that they must be classed as privy vaults, although by the use of disinfecting chemical greatly improved results are secured. Chemical closets as installed and as advertised by the manufacturers and sales agents, violate several provisions of Title 18 of the code. These violations are as follows:

Title 18, Section 4, permits the use of vitrified brick or concrete in the construction of a privy vault but does not specify metal construction. This violation, however, is not important. Title 18, Section 5, requires seats in outhouses to be self-closing. This is violated in the construction of the seats used in the chemical closets examined. Title 11, Section 7, prohibit "pan, valve, plunger, offset, washout and other water closets except latrines having invisible seals or an unventilated space, or the walls of which are not thoroughly washed at each discharge". This section also applies "to the dry closet system, or other system of closets in which the venting, back venting or local venting is to be made otherwise than prescribed" in the code. In the construction of the chemical closet bowl and dip pipe this section is violated, due to the fact that the bowl and dip pipe furnish a fouling space which is not self-cleansing and requires constant attention. Title 18, Section 5, requires a vent pipe or box extending upward and three feet aobve the roof with a sectional area of at least 36 square inches for every square yard or a part thereof of vault surface. This provision is violated by the use of a 4-inch vent pipe in the chemical closet. The cleanout provided in the chemical closet, a 14-inch circular opening, does not comply with Title 18, Section 6, which requires a clean-out extension not less than 2 feet by 1½ feet in size.

The most important violation of the code is that relating to the location of the chemical closets installed. It has been the practice of the manufacturers and sales agents to advise their location within or immediately adjacent to buildings used for human habitation or occupancy. Title 18, Section 3, specifies the location of privy vaults at least 2 feet from a lot line, 20 feet from a street line or any building of human habitation or occupancy, and 50 from any cistern, well or other source of water supply.

It is evident that certain features of construction of chemical closets should be altered and that the location selected should be changed to meet the requirements of the Ohio State Building Code.

Your committee begs to submit the following:

RECOMMENDATIONS.

It is recommended that no action be taken by the State Board of Health rescinding a resolution adopted by the Board March 19, 1914, disapproving the use of "this system (chemical closets) in or immediately adjacent to a building used for human habitation or occupancy" and determining "that if the aforesaid closet system be installed, such installation shall be in accordance with the provisions of Title 18," Part 4, Ohio Building Code.

The manufacturers and agents of various chemical closets and disinfecting chemicals for the same should be notified as follows:

1st. That the design, method of construction and location of chemical closets as advised by the manufacturers and selling agents and as installed, are in violation of the Ohio Building Code, and that the State Board of Health will not permit a continuance of these violations and will require a revision of plans and descriptive matter suggesting such violations; and,

2d. That the State Board of Health will permit the installation and use of so-called chemical closets if the following provisions of Part 4, Ohio Building Code, are complied with:

a. Location, Title 18, Section 3;
b. Bowl and dip pipe, Title 11, Section 7; and,
c. Seats, Title 18, Section 5.

(Signed)

Committee
W. H. DITTOE,
Chief Engineer.

WM. C. GROENIGER,
Plumbing Inspector.

GOVERNOR WILLIS RECOMMENDS ADEQUATE APPROPRIATION FOR STATE HEALTH WORK.

"Adequate appropriation is recommended to carry forward the work of the State Department of Health in sanitary engineering, industrial hygiene and the prevention of communicable diseases. Provision should be made to furnish through this department free diphtheria anti-toxin, to all state institutions and to all indigents in the state. Very properly and wisely the state is now providing and making hog-cholera serum; some provision ought to be made for poor children who are so unfortunate as to contract diphtheria. The field of usefulness of the state Sanatorium for Tuberculosis should be extended so far as the condition of the treasury will permit by allowing any citizen of the state to be treated in this institution on the same basis as in other state institutions, the payment of fees for treatment to be placed in the hands of the State Board of Charities. Such action relative to the public health and our state institutions will tend to preserve the health of the people and thus be of lasting service to generations yet unborn. I shall reserve for a possible future message during your present session recommendations concerning the civil service, the highway laws and other important matters. I trust that, with an eye single to the public welfare and with full understanding of the grave responsibilities confronting you, early and continuous effort will be put forth by the General Assembly to transact expeditiously and wisely the important public business before your honorable body."—*From the Inaugural Address.*

DECEMBER MEETING STATE BOARD OF HEALTH.

The regular monthly meeting of the State Board of Health was held at Columbus, December 10.

The Board took up for consideration the complaint that the German-American Sugar Company at Paulding has polluted Flat Rock Creek by discharging into it the wastes from its beet sugar plant. A citation having been issued, officials of the company appeared at this meeting to show cause, if any exists, why the company should not treat the wastes to such extent as to avoid the creation of a nuisance. Statements were made by these representatives to the effect that they had been unable to find a satisfactory method of treating beet sugar wastes, but their attention was called to the fact that this had been successfully done in other parts of the United States. After much discussion the Board adopted an order requiring the German-American Sugar Company to install and have in operation prior to October 1, 1916, a plant to treat these wastes to such extent as to abate the pollution of Flat Rock Creek. This order has been sent to the Governor and Attorney-General for approval.

An investigation of a complaint, that the city of Salem was causing a nuisance by the discharge of sewage and other wastes into a county ditch, having shown that the complaint was well founded and the city officials failing to respond to a citation to appear at this meeting, an order was adopted by the Board requiring the city of Salem to install the necessary sanitary sewers and connections thereto to intercept the sewage at present discharged into the county ditch south of the city and to convey the same to the existing main trunk sewer and sewage treatment plant. This order will become effective as soon as approved by the Governor and Attorney-General.

Officials of the city of Lancaster appeared in response to a citation to show cause, if any exists, why that city should not install the necessary sewers to collect the liquid wastes from the entire city to one point of discharge and also a sewage treatment plant to prevent the pollution of the Hocking River. The claim was made by the city officials that a leather board plant connected to the city sewer system is responsible for the nuisance complained of by the trustees of Berne township, but this statement was not borne out by the investigations that have been made by the Division of Sanitary Engineering, these investigations indicating that there was sufficient sewage discharged from the city of Lancaster to cause serious pollution of the Hocking River. After full consideration of the statements of the city officials an order was adopted requiring the installation within two years of the necessary sewers and a sewage treatment plant. Such an order has been sent to the Governor and Attorney-General for approval.

Upon complaint of more than 10% of the electors of the village of Napoleon, the Division of Sanitary Engineering had investigated the condition of the public water supply of that village. This investigation showed that the supply was impure and dangerous to the health of the consumers. Representatives of the village were present at this meeting and admitted that the water supply was impure, and that the financial condition of the village was all that stands in the way of the needed improvement. An order was adopted and referred to the Governor and Attorney-General requiring the village of Napoleon to install and properly operate a water purification plant.

The Board approved plans for a proposed new water supply and water purification plant for the city of Wooster, the supply to be taken from Killbuck Creek. Conditions were attached to the approval requiring the city to provide competent supervision and operation of the plant. The proposed supply and the purification plant are to be installed and in operation prior to January 1, 1916.

Detail plans and specifications for filter equipment and operating machinery for the new water purification plant for Cleveland were approved.

The Board approved plans for proposed improved water supply and water purification plant for the city of Zanesville, the supply to be taken from the Muskingum River and properly purified. The city was required to provide for competent supervision and operation of the proposed plant. Contracts for the proposed improvement are to be awarded prior to June 1, 1915.

Plans for a proposed water supply and water softening plant for the State Normal School at Bowling Green were approved upon condition that the proposed water softening plant shall at all times be satisfactory to the State Board of Health and that the water softening plant shall be installed prior to January 1, 1916.

The Board approved plans for proposed additional sewerage for the Ohio Soldiers' and Sailors' Orphans' Home near Xenia. The proposed sewerage is for property recently acquired and to be used as a kindergarten.

Plans for proposed sewerage and sewage treatment plant for the Paulding County Infirmary were approved upon condition that devices for secondary treatment of the sewage prior to its discharge into Flat Rock Creek shall be installed when deemed necessary by the State Board of Health. The proposed improvements are to be made prior to June 1, 1915.

After consideration of complaint that the village of Bryan was causing a nuisance by discharging sewage and other wastes into certain small streams in or adjoining the village, the Board voted to cite the officials of Bryan to appear at the next regular meeting to show cause why the village should not install the necessary sewers and sewage treatment plant to correct the pollution of these streams.

The report of a special committee appointed to investigate the complaint that the city of Cleveland was discharging sewage and other wastes into Lake Erie was presented. As a result of this investigation, the Board found that Lake Erie was polluted to such extent as to give rise to foul odors in the vicinity of the sewer outlets and to conditions detrimental to the health and comfort of citizens of the city residing in the vicinity of the Lake. The officials of the city of Cleveland have been cited to appear at the next meeting of the Board to answer to this finding.

The Board approved plans for a proposed storm sewerage system for Ottawa Hills, a sub-division in Lucas County. The county commissioners, who will install the sewer system, are required to provide for proper control and establishment of all connections to the proposed sewers and to prevent the discharge of sewage or other objectionable wastes into them.

Health Officers appointed to serve in place of a board of health were approved for the following: Lockbourne, Mowrystown, and McClure.

The Board accepted with regret the resignation of Mr. Harold McGee, an assistant in the Division of Sanitary Engineering. Mr. McGee expects to engage in the same line of work in connection with the State Board of Health of Michigan.

Mr. Russell D. Scott of Columbus was appointed as assistant bacteriologist in the Division of Hygienic Laboratories.

The question of reprinting a report submitted to the United States War Department in 1896 was presented by Mr. Hill. This report is the result of a careful investigation of the canal system of the State of Ohio, with the object of determining the feasibility of constructing a ship canal. The edition of the report has been exhausted for some time and the valuable information in the report is no longer available. For this reason, the Secretary was instructed to learn what measures would be necessary to be taken to have the report reprinted.

The Board instructed the Secretary to arrange for a conference of municipal health officers. This conference will be held in Columbus, January 28 and 29 and will be for representatives of the health department of all cities and all villages having a population of 3,000 or more.

The next regular meeting of the Board will be held in Columbus January 27, 1915.

PUBLIC HEALTH ACTIVITIES IN OHIO.

Public Health Exhibit.

Completely renovated, the Ohio State Public Health Exhibit will begin a tour of northwestern Ohio, beginning in Galion, January 19th-22nd. It will then be sent to Bucyrus, January 26th-29th, and then to Fostoria, February 2nd-5th. Definite arrangements have not been made with the other cities included in the tentative itinerary published in the December issue of the Monthly Bulletin. An important addition to the Exhibit is a new model of a filtration plant, built in accordance with the specifications and plans drawn up by the Division of Sanitary Engineering. This model should be interesting and instructive to the visitors to the Exhibit because it serves to put before them in a concrete manner the modern means and methods for supplying a community with pure water.

Red Cross Christmas Seal Sale.

Indications point to the largest sale of seals in Ohio that has ever taken place since this means of financing the anti-tuberculosis work was first begun. A preliminary report of the sale will be made in the next issue of the JOURNAL.

Organizations.

On December 2, the Mansfield Public Health Nursing Society was organized with the following officers: president, Dr. John Maglott; vice-president, Mrs. J. E. Clark; secretary, Mrs. J. Arthur L. Redrup; treasurer, Dr. Ada Ford.

On December 27th, the Nelsonville Red Cross Society was organized with the following officers. president, Dr. A. L. Pritchard; vice-president, Mrs. W. H. Parks; secretary, Mrs. R. H. Jackson; treasurer, Mrs. J. L. Eberle.

Public Health Nurses.

Miss Viola Fell succeeded Miss Edith Kendall as public health nurse in Zanesville on December 1st.

The Board of Education of Alliance employed Miss Mary J. Taylor as school nurse on December 1st.

On December 29th, Miss Amy Mercer, State Traveling Public Health Nurse resigned and was succeeded by Miss Elizabeth Davison on December 31st, who went to Bucyrus where she will remain for one month. In addition to Bucyrus, there remain to be visited Xenia, St. Marys, and Bellevue, in the list of winning towns as a result of the contest conducted during the Christmas Seal Sale in 1913.

Hospitals.

"The Springfield Lake Sanatorium" is the name which has been officially adopted by the board of trustees for the five-county tuberculosis hospital located at Springfield Lake, Summit County. Some delay has been experienced in completing the construction work, but advices indicate that the institution will be opened for the reception of patients by February 15th.

Weekly Health Letter.

The health department of Youngstown is planning to issue through the columns of the newspapers a weekly letter to properly inform the public of the health conditions in the city. These articles will contain information about the general health conditions and will be instructive as well. It is the aim to disseminate information concerning the prevention of disease and to furnish practical helps as how to do this. The first letter was issued in January. This plan gives promise of success and if proper attention is given to this service, it will be of immense value to the people of that community. Perhaps this has some application to your work. Think it over.

Public Health Exhibit.

Editor Gazette:

The experience of looking into and treating the mouths of Delaware people for several years qualifies one to appreciate the need of such a campaign as is being carried on by our State Board of Health. While the exhibit comprehends general hygiene, much more good will result if it awakens an interest in oral hygiene also.

Delaware's vaunted culture looks better with its mouth closed. Delaware dentists have been talking to their patients for years about the need of keeping the mouth clean and healthy; lecturing, cautioning and urging, with but little effect in many cases except to have their motives questioned. In full co-operation with the district, state and national societies, they have contributed to the humanitarian projects, to the fund for scientific researches, and to the campaign of public education, which is beginning to awaken the people to the wisdom and economy of oral hygiene and preventive dentistry.

Preventive Dentistry is the big brother of Preventive Medicine, since all of the food and drink and much of the air enters the body through the mouth. The intimate connection between the teeth and the general health has never been sufficiently impressed upon the masses of the people. Sanitary surroundings are of little value to a person with an unsanitary mouth. Pure air, pure food, pure water and milk become foul and poisonous passing through a diseased mouth, and by being masticated with decaying teeth.

Do not fail to see the exhibit and attend the lectures in the former store room of the Galloway Co., Tuesday, Wednesday, Thursday and Friday. — DELAWARE DENTIST. — *Delaware Gazette,* December 14, 1914.

Loses His License.

After a hearing of the charges filed against him, the state medical board Friday revoked the license of Dr. Albert C. Goode of Columbus and Lima. He was charged with obtaining in the neighborhood of $2,000 from a Franklin county farmer by alleged unprofessional methods. Goode was before the board on a revocation charge in 1908, but he was let off then upon promising to comply with the board's regulations. — *Columbus Dispatch,* December 11, 1914.

To Make Toledo Health Survey.

Dr. Carroll Fox, United States department of health, will make a health survey of Toledo.

By direction of Surgeon General Rupert Blue, Dr. Fox will come to Toledo soon after January 1st. His investigations here it is anticipated will require two months' time.

Dr. Fox will make detailed and complete report of health and sanitary conditions of the city, and offer recommendations for such improvements as may be found necessary.

The investigation by the government expert is to be made upon request of the Ohio board of health, Toledo board of health, Toledo Academy of Medicine, health committee of the Commerce Club, Homeopathic Society, Thalians, District Nurse Association and Toledo Dental Society.

MANY BABIES DIE.

These organizations, in their work for preservation of public health, have ascertained that 300 babies less than one year old, die in Toledo yearly. They believe that 50 per cent. of them can be saved. Establishment of at least three pure-milk stations is proposed. Elimination of all surface wells, many of which are contaminated, it has been ascertained, is proposed. Diversion of all sewers from the Maumee river, the source of the public water supply, has been considered also. This would cost millions of dollars, according to roughest estimates.

Toledo spends for public health only 14 cents per capita each year. It is believed that this is inadequate. The health officer gives a portion of his time to his public work, and is paid $1,800. It is proposed to employ an expert and command all his time.

UP TO NEW OFFICIALS.

These are a few of the anticipated results of the health survey. The recommendations will be submitted to the first city officials to be elected under provisions of the new charter. They will take office January 1, 1916.—*Toledo Blade,* December 29, 1914.

Change Entire Idea of Public Work by Doctors.

STATE WANTS YOUNG MEN TO TAKE UP HOSPITAL SERVICE WITH EXPECTATION OF REMAINING.

TWO BOARDS CONFER.

Idea of Employing Only Unmarried Men is Frowned Upon by State Officials.

Because doctors are married, they should not be barred from entering the state service, but they should rather be encouraged. The services of many good men are lost to the state because in some of the hospitals single men are preferred over those married.

This condition has caused Chairman Hoskins of the state civil service commission to issue a letter to the superintendents of all state hospitals, in which the object of the civil service law is called to their attention. The letter was written after a conference had been held with the members of the board of administration, who approved of the plan for securing the best service of young men in these state institutions. It backed up the civil service commission, and gave its endorsement to the letter which will reach the superintendents within the next few days.

FOR LIFE WORK.

"The purpose of the civil service law is to procure the best possible service for the state," the letter says, "and to induce bright, capable young men to enter the service with a view of making the public service their life work."

Continuing, the letter says: "Our commission has conferred with the board of administration, and we have decided that the superintendencies of the different state institutions shall be filled from the ranks of assistant physicians by promotion. The prospect of promotion is the one thing that will induce the best class of men to enter the state service, and keep them there."

The commission questions its right to prescribe that only single men shall take the examination, and be admitted to the eligible list. "We have found", the letter says, "a number of heads of institutions objecting to the appointment of married men to their medical staff. We believe that if only unmarried men are admitted as assistant physicians, it will desroy the whole system of promotions, because the married state is the natural one, and men cannot be expected to refrain for the purpose of holding a given position. The state is not expected to provide for the wife or family of an assistant physician, but we believe the fact that a physician has a wife and children should not bar him from the public service."

CURRENT COMMENT ON MATTERS OF PUBLIC HEALTH AND SANITATION.

The Pasteurization of Milk.*

The term "pasteurization" is derived from Louis Pasteur who showed that by heating beer and wine to 145° F. the "diseases" caused by souring and abnormal fermentation were prevented. Soxhlet in 1886 carried out the first experiments in connection with the heating of milk.

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The necessity for pasteurization is due to the large number of dairies, wholesale and retail dealers, and their employees, who have to do with the milk supply. Milk is very susceptible to contamination and even the most efficient system of milk inspection will not protect against occasional contamination and resultant tragedy. Another reason for pasteurization is that comparatively few of our cattle are tuberculin tested, and a large percentage of these cattle have tuberculosis, even in Western Canada where this disease is supposed to be rare in animals. Untested cattle from the East are constantly introducing the disease and it is apt to become very common if the necessary prohibitive legislation is not adopted. In 1911 at the Third Dominion Conference of Dairy Exports Mr. Frank Herns strongly advocated the pasteurization of whey from cheese factories in order to prevent the further dissemination of tuberculosis among hogs and calves. This practice has been adopted in Denmark and Germany for some time. If calves and hogs should be protected in this manner, why not human beings? Of all food commodities, milk is the most difficult to handle, and to keep free from contamination. Milk containing 50,000 bacteria per c. c. is considered of excellent quality, while a large proportion of the city milk will average counts of from 2,000,000 to 3,000,000. The objects of pasteurization are to prevent the dissemination of pathogenic organisms, and to allow wholesale dealers to handle mixed milk in a satisfactory manner. It is impossible to do without wholesalers in cities, and impossible for them to distribute a milk of uniformly good quality without pasteurization.

The view commonly held by many medical men that pasteurized milk is productive of poor results and actual disease in infants to whom it is fed, does not stand the test of scientific experiment. Many authorities have shown not only that pasteurized milk does not harm infants, but that infants who use such milk exclusively average a higher percentage of gain than those fed with raw milk. Rickets and scurvy are not caused by pasteurized milk. Rickets is found among children who are breast-fed as commonly as among those who use pasteurized milk, and it has been shown that infants who have the disease will be actually benefitted by properly pasteurized milk. The distinction must here be made between pasteurizing and cooking or boiling, entirely different processes. Milk of unknown source should certainly be pasteurized for infant feeding. It is difficult to say whether certified or pasteurized milk is the better for infant feeding. No rule can be laid down as the physician must be governed by the needs of each individual case.

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*Abstracted, The (Canadian) Public Health Journal. 1914.

The changes caused by pasteurization must now be considered. It has been shown that by heating milk to a temperature of 140° F. and holding at that temperature for a period of thirty minutes, all the specific pathogens including B. Tuberculosis will be destroyed. On account of the large amount of tuberculosis among dairy cattle, and the large number of milk samples which contain the tubercle bacillus, the standard method of pasteurization should be that which will destroy this resistant organism. As an argument against pasteurization it has been said that the process will kill the organisms but not the toxins they develop. There are few organisms found in milk which produce toxins, and the effect of such toxins as are produced is practically nil when they are introduced through the alimentary tract. Inoculation into animals is quite a different matter and has no practical application to a food like milk which is swallowed. Spore-bearing organisms present in milk will not be destroyed by pasteurization. However, if such milk is consumed within twenty-four hours following pasteurization, such organisms will exert little influence. The ferments in milk which exert such an important influence in preparing milk for infant digestion are not destroyed by pasteurization provided the temperature is not raised above 149° F. Few chemical changes take place in milk heated to from 140° F. to 149° F. for thirty minutes and none of the changes that do take place render the milk difficult of digestion.

The three principal methods of pasteurizing milk are the flash, the holding and bottle pasteurization. The last is the ideal method and recently machinery has been perfected so that it may be accomplished easily and efficiently. The flash method is not only worthless for ordinary purposes, but it also impairs the digestive qualities of the milk. It is suitable for preparing cream for butter and ice cream. The holding method allows of contamination from the bottles, and such contamination is doubly dangerous at this time when the bacterial content is low and pathogens find no bacterial enemies.

Pasteurization must not be a cloak for dirty milk. Certain standards should be insisted upon, and the best standards for this purpose are furnished by bacterial counts. In Chicago raw milk prior to pasteurization must not contain more than 750,000 bacteria per c. c. from October to May 1st, and not more than 1,000,000 bacteria per c. c. from May 2nd to September 30th. The standards for cream allow of slightly higher counts, — 800,000 and 1,500,000 bacteria per c. c. for the respective periods above mentioned. Only recently has the value of a wholesome city milk supply been realized. "It is the chief factor influencing a city's infant mortality rate".

In conclusion, it is a safe principle to require pasteurization of all milk which is not certified, or which is of an exceptionally high standard.

The Milk Supply as a Causal Factor in Relation to Tuberculosis.*

Since 1897, examinations of the milk supply of Manchester for the tubercle bacillus have shown that a large proportion of samples are infected. This proportion has varied from 5.5% in 1909 to 11.8% in 1903. Since 1910 the percentage has increased from 5.9% to 11.2% in 1913. It is difficult to explain this increase since 1910, unless consideration is given to the greatly increased movement of cattle, or the increased virulence of the germ or decreased resistance of the animal. The number of organisms in the samples has greatly decreased, however, for whereas 20 per cent of the samples capable of producing tuberculosis by inoculation were positive microscopically in 1897, only 3 per cent of such samples are positive now. Before estimating the effect of the improved milk supply upon the mortality from tuberculosis, benefits due to other factors must be eliminated. The latter do not affect the tuberculosis mortality alone, however, but the general death rate. If the reduction in the mortality from phthisis is less than the reduction from other forms of the disease, it is evident that factors having to do with such less common forms have been eliminated or modified. For the purposes of comparison the death rate for the quinquennium 1906-1910 is used as a unit to compare with the rates for previous quinquennia. By this means it is seen that the number of deaths from all causes corresponding to 100 in 1906-1910 was 136 in 1886-1890. The improvement between the years 1891 and 1910 from all causes, from phthisis and from forms of tuberculosis is expressed by the following rates for certain age groups (1891-1910).

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*Abstracted, British Journal of Tuberculosis, 1914.

Age Groups.	*All Causes.*	*Phthisis.*	*Other Forms.*
All ages	1.33	1.26	1.64
Under 1 year	1.26	0.90	2.12
Under 5 years	1.43	0.92	1.98

The ratios for all causes and for tuberculosis other than phthisis show that the rate of reduction in the mortality from these causes has been much the greater in the case of tuberculosis other than phthisis. The improvement in infantile mortality is probably attributable to the reduction in the amount of tuberculous milk. This improvement might, however, be considered as general throughout the country and not peculiar to Manchester, or to places where an effort is made to reduce the amount of tuberculous milk. It is found that Manchester does not alone show an improvement, but that the improvement in mortality from tuberculosis other than phthisis is everywhere greater than the improvement in the rate from phthisis alone. This is probably due to the fact that there has been within the last few years a general improvement in milk supplies and a reduction in the amount of tuberculous milk distributed. As the work in Manchester antedates all others, the improvement should be greater here than elsewhere. In the following table the differences between the ratios relating to tuberculosis other than phthisis are shown:

	England and Wales.	*Manchester.*	*Gain for Manchester.*
All ages	144	164	20
Under 1 year	180	212	32
Under 5 years	159	198	39

Here it is clearly shown that the ratio of improvement particularly in children under five, is much greater in Manchester than elsewhere. Although much discussion has resulted as to the amount of human tuberculosis attributable to tuberculous milk, there is clear and cumulative evidence that cow's milk plays a very important part in the production of infantile tuberculosis in England and Scotland.

The Tuberculosis Problem In Rural Communities.*

Under this title Dr. S. Adolphus Knopf elaborates an address which he had delivered previously before the annual conference of sanitary officers of New York State.

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*Abstract, Public Health Reports, 1914.

There is quite a difference in the method by which tuberculosis must be attacked in a city and in a town or village. There is not the administrative machinery of a large city and the health officer is not always free to say and do what he thinks is best for the interest of the community at large, because of close personal relations. For example, in enforcing an anti-spitting ordinance such friendly and neighborly relations as exist between the rural health officer and his constituents make the carrying out of sanitary regulations exceedingly difficult in rural communities. Much the same situation exists so far as requiring the reporting of tuberculosis cases.

There is a further difficulty confronting the health officer in a rural community in the prejudice of the people against locating a hospital in the vicinity of their homes and on the part of many tuberculous individuals against entering such an institution. The most difficult phase of the tuberculosis problem in rural communities is phthisiophobia — the exaggerated fear of the presence of a tuberculous individual. A majority of tuberculous persons think themselves perfectly harmless and object to entering tuberculosis institutions for fear of becoming infected there.

Upon the early discovery and the prompt treatment of the tuberculous invalid, at the right time and in the right place, depends in no small degree the solution of the tuberculosis problem.

What then can the health officer of a rural community do, in the face of these difficulties, to make a successful fight against tuberculosis, Dr. Knopf seeks to answer this by picturing and ideal health officer, because the entire success of his work depends upon his position in the community. If he has tact, is respected in the community, and is a trained sanitarian, his educational work, since the solution of the problem hinges upon this, will bear fruit. He should be able to give good practical talks to physicians and laymen on medical topics, sanitation and the prevention of disease.

The health officer of any county must and should be paid a salary high enough to make him independent of practice, so as to enable him to devote all his time to his official duties. His position should be for life or as long as he is able to do his duty, and should never depend upon political preferment. If the community is too small to maintain a well-paid health officer a number of smaller communities should unite under the administration of one health officer.

This health officer should seek to organize his fellow practitioners and leading laymen into a league or society pledged to give him support in his efforts to stamp out the disease. He should then set out to educate the people living in his district, by means of lectures, exhibits, and newspaper articles. He should give attention to the hygiene of rural schools and advocate open-air schools. The hygiene of the churches should receive his concern. His object should be to see that there is no uncared-for tuberculous individual in his jurisdiction.

Tuberculosis — The Home Hospital Experiment.*

The Home Hospital experiment was begun on March 19, 1912, by the New York Association for Improving the Condition of the Poor. It is located at Seventy-Eighth Street and John Jay Park, New York City. There are forty-eight apartments consisting of from two to four rooms each, including one or more bed chambers with open-air sleeping balconies. Each room is provided with a maximum of sunlight and ventilation. The windows, extending from ceiling to floor, are arranged in three sashes, so that when open, two-thirds of the space is unobstructed. On the roof is a spacious solarium, a part of which is reserved for the patients; another part for the children as a playground; and still another for a fresh-air school.

In selecting families to participate in the experiment, preference is given, first, to families in which both poverty and tuberculosis are more or less incipient; second, to families believed to possess sufficient intelligence to co-operate in the experiment; third, to families in which dependency is due to tuberculosis of the wage earner; and, fourth, to families in which tuberculosis of the mother renders it inadvisable to keep the home together under ordinary circumstances; in general, to poor families made or kept dependent by tuberculosis and in which the disease is not more than moderately advanced.

The hospital has cared for 62 families during the past two years. These included 315 individuals classified diagnostically as positive cases, 136; suspects, 71; non-patients, 108. The medical results show that 25 families were discharged, 17 of which were rehabilitated physically, socially and economically. Eight families were discharged because they refused to co-operate. Not a single patient who followed advice failed to improve. The daily cost per family was $3.32; per individual, $0.65; per patient, $0.66; per non-patient, $0.63. The cost per patient of 66 cents compares favorably with the average per capita cost of 17 New York State tuberculosis institutions giving individual treatment, the figure for which is $1.40.

It is claimed that the advantages of the Home Hospital method of treating tuberculosis as against the institution method are first, its low per capita cost; second, the directness of its attack upon the home conditions; third, the early detection and check of incipient cases; fourth, the adequate control of the disease and family; fifth, the avoidance of difficulties involved in the separation of the sick from the well members of the family; sixth, its care of classes of patients, who either could not or would not go to institutions; seventh, its fostering an increase of earning capacity in the wage-earner and a gradual return to normal conditions; eighth, its provision against a return of either the patient or family to the inimical environment where the disease was contracted and is likely to recur; and ninth, its care not only for the physical but for the economic and social ills; not merely for the patient but for the entire family.

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*Abst. Public Health Reports, 1914.

The Relation of Pulmonary Tuberculosis to Soil Formation.*

Why does not every person have pulmonary tuberculosis? The tubercle bacillus is everywhere. We are all exposed to the direct cause. We cannot have tuberculosis without the bacillus of tuberculosis, but this cannot grow and develop unless there is a proper soil for its growth. Some persons seem immune to tuberculosis. Why are some persons immune and others not?

One of the most prominent causes is "lime starvation." In all cases of incipient tuberculosis, there is a deficiency of calcium and the elimination of calcium salts from the body is increased. The calcium found in the system comes originally from the soil. There is not much difference between humid and arid soils, except in the amount of calcium that they contain, estimated as oxide of calcium. People living in arid regions have more lime in the system than those who live in humid regions. There is less tuberculosis among the people living in arid regions. Plants and vegetables grown in arid regions have more lime in their composition than those from humid soils. In arid regions the air contains more dust which is loaded with lime and as a result the inhabitants inhale lime dust which has proven to be beneficial. There is a missing link in the chain constituting the immunity and prevention of pulmonary tuberculosis. Is calcium that link?

The Cost of Tuberculosis and Typhoid.

Estimates regarding the loss caused by preventable diseases are always interesting, although necessarily general. The smaller the area affected, the more accurate are the figures apt to be. Prof. Irving Fisher's estimate, in his report on national vitality, of the economic loss for the entire country at one and one-half billions a year is familiar to students of public health conditions. An estimate recently issued by the Minnesota State Board of Health shows the economic loss from death from typhoid fever in Minnesota in the last six years to be $21,958,940, while the deaths from tuberculosis are six times as great and the loss three times as great as that from typhoid, or $66,583,320, making a total loss from the two diseases alone of $88,542,260 for six years, or an annual loss of $14,757,043. In making this estimate the following economic values were used in computing the financial loss from deaths: professional, business men and farmers, $500; skilled laborers, $300; unskilled laborers and domestics, $200; married women, $200; children under 15 years of age, $100. These valuations are conservative, in the opinion of *The Journal of the American Medical Association,* and should represent the minimum rather than the maximum loss.

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*Abst. Medical Record, 1914.

Tuberculosis and Divorce.

A new cause for legal separation has been added to an already long list by the supreme court of New York state. It is consumption. The action in question is termed an annulment rather than a divorce, but the distinction is of no great importance.

At the time of his marriage Joseph Sobel, the defendant, was already suffering from tuberculosis. His fiancee did not know it. He had assured her that it was only a severe cold, although his physician, the wife testified, had told him his marriage would be a "criminal act." Within a few weeks of the wedding Sobel was ordered west for his health and the couple separated. No children were born. The victim's case is pronounced hopeless. The court, in deciding the case, established an absolutely new precedent, declaring that on account of the infectious nature of tuberculosis and the predisposition of a patient's offspring to succumb to the disease, it would be a "gross perversion of justice to refuse to release the wife from the marital contract."

The decision may have a wide-spread effect in determining judicial action — and also public opinion — in regard to infectious or contagious diseases in general in so far as they concern marriage relations. — *Sandusky Register,* Dec. 14, 1914.

The Flight of Flies.

One of the problems that has arisen in connection with the part played by insects as carriers of disease concerns the distance which they may be able to travel from one locality to another. This has frequently been considered in this country in connection with mosquitoes which are responsible for the prevalence of malaria. With their breeding-places known, it has become desirable in some cases to ascertain what the range of their activities might be in respect to the territory which can be covered by insects. It has been learned that mosquitoes which inhabit salt marshes near the seacoast may be found inland at a distance as great as three miles.

Far less appears to be known with regard to the migrations of the common house-fly, an insect charged with responsibility for typhoid fever and other infectious diseases. A series of studies conducted in Cambridge, England, on the range of the flight of flies of this species has been made the subject of a report to the Local Government Board on Public Health and Medical Subjects. Upward of 25,000 flies were liberated, under various meteorologic conditions, from the medical buildings at Cambridge. Of these insects, colored for identification, 191 were recovered. The results showed that house-flies tend to travel either against or across the wind. The actual direction followed may be determined either directly and by the action of the wind, or indirectly owing to the flies being attracted by odors from food. A point in favor of this supposition is the nature of the station at which flies were recovered after they had traveled any distance. These comprised a butcher's shop, public houses and a restaurant, all of which gave off odors that are notoriously attractive to flies. The chief conditions favoring the dispersal of flies are fine weather and a warm temperature. The nature of the locality is another considerable factor, because in towns flies do not travel as far as in open country, probably due to the food and shelter afforded by the houses. With regard to the altitude of the point of liberation, flies set free from the roof tended to disperse slightly better than those liberated from the ground, but the differences are not very considerable. It has been observed, with regard to the vertical flight of the house fly, that it may mount almost directly upward to a height of forty-five feet or more. The time of day appears to influence the dispersal of the insects, as, apparently, when set free in the afternoon they do not scatter so well as when liberated in the morning.

The maximum flight observed in the thickly housed localities in Cambridge was about a quarter of a mile. In one case, where a part of the distance was across open fenland, a flight of 770 yards was noted. In experiments conducted in Cook County, Illinois, by S. A. Forbes, flies were trapped and, after being sprayed with a chemical solution for recognition, were liberated from a hospital in that district. They too were recovered at distances ranging up to a quarter of a mile from the point of liberation. The distance flies may travel to reach dwellings is controlled by circumstances. Almost any reasonable distance may be covered by the fly under compulsion to reach food and shelter.

Eye Strain in Children After the Measles, Scarlet Fever and Allied Diseases.

Our excellent boards of health in many cities in the union, have very wisely directed that children suffering from the diseases above mentioned should be segregated from the rest of their companions in school for a considerable length of time during the continuation of their affection as well as afterward for fear of infection or possible contagion. This is eminently proper, and should be persisted in carefully, and a rigid quarantine effected and properly maintained during the disease and so long afterward as is deemed necessary.

There is, however, an additional reason why after an apparent cure of the local or constitutional disease, the children so affected should be granted a considerable vacation, and that is the eye-strain which almost invariably accompanies these diseases, and continues with the sufferer for some time after apparent bodily recovery. If we permit children so affected to enter school at once, at the time when the physicians permit them to return as free from contagion, there is great probability that bad results will follow, so far as the eyes is concerned. For they are at this time weakened for use at near objects, and the sudden exertion demanded from them, as for instance, in writing in a book and then looking at a distant blackboard for notes, or in looking at a book and then at an example on the blackboard, exerts the accommodation of the eyes to an unusual degree and leads to eye-strain from which recovery may not take place for months. Instances of this sort have also been recently observed after the mumps, in which the eyes could not be used for near work for seven weeks, the least exertion being followed with a flow of tears, smarting and burning of the eyes.

Instances of this sort of eye-strain, occurring daily in the practice of oculists ,prove how intimately the eyes are connected with the body and the folly of regarding them as mere things by themselves, the sight of which needs only to be tested by inexperienced men. People have to be taught by constant repetition, that the eyes are a part of the body, and are constantly exhibiting symptoms, such as have above been mentioned, to prove their close relationship.

Anti-Typhoid Vaccination.*

It has long been known that in certain infectious diseases a single attack protects against a subsequent attack. It has also been understood that a mild attack likewise confers immunity. Protective inoculation was first practiced in smallpox. Prior to Pasteur's demonstration in 1880 that inoculations of attentuated material protected against anthrax and chicken cholera, such inoculations were used by the natives along the Zambezi River to protect their animals against pleuro-pneumonia. The names of Beumer, Pfeiffer, Wassermann, Wright and Leishmann are associated with the early attempts to protect against typhoid fever by means of vaccines. This method was used in the Boer War in South Africa and in the German army during the Herero campaign. The success of this procedure was quite marked but the method was not universally accepted until Russel's work in the American army showed conclusively that anti-typhoid vaccine would protect against typhoid fever and that no harm resulted from its inoculation into healthy persons. In 1911, fifteen hundred soldiers were stationed in Texas. They were allowed free access to certain towns in which typhoid fever prevailed at the time. All the soldiers had been vaccinated and only one contracted the disease, having had only two inoculations. Ex-President Taft considered this demonstration of the efficacy of anti-typhoid vaccine one of the five notable achievements during 1911. Our experience with the vaccine (Connecticut) began in 1911 when an epidemic of typhoid fever developed in Torrington. An emergency hospital was established and eighty trained nurses were employed. Forty-five of these nurses were vaccinatd. Not one contracted typhoid fever. Of the thirty-five unvaccinated nurses, four developed the disease. In Torrington over 400 inoculations were given. Only healthy persons were selected. One person so treated took sick with typhoid fever after the second inoculation, having probably been in the incubation period previously. About one-third of the Connecticut militia are vaccinated. A private developed the disease after his second inoculation and this occasioned so much adverse criticism that the War Department at Washington was asked to investigate and Major Russel was sent.

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*Abstracted, The American Journal of Public Health, 1914.

He showed that far from causing the disease the prophylactic had probably modified its severity. Our vaccine is prepared in the same manner used by Major Russel. The inoculations are given at four o'clock in the afternoon. The reactions are two in number — a local swelling and slight systemic reaction indicated by a slight elevation of temperature. Children react less than adults. The Widal reaction is always positive after typhoid inoculation.

Anti-typhoid vaccination will never supplant other sanitary measures for the eradication of typhoid fever, but it will prove of great benefit to soldiers, travellers and those whose occupations predispose them to contact with the disease.

The Viability of the Typhoid Bacillus in Sour Cream.*

It has been shown that typhoid bacilli quickly die in sour milk, butter-milk and other sour milk preparations. This is due to the action of the lactic and butyric acids contained therein. On account of the fact that this was used as a means to show that the pasteurization of sour cream was not needed, the following experiments were undertaken. A 1-10000 dilution of a 24-hour broth culture was used. This was added to sour and sweet cream in varying amounts and the mixtures kept in the ice box and at room temperature. In this experiment inability to recover the typhoid bacillus was thought to be due to the overgrowth by other bacteria. In another experiment seven million typhoid bacilli were added to cream which was allowed to sour at room temperature, and the acidity as well as the percentage of typhoid bacilli determined.

Plated at once	Typhoid 90%.	Reaction 1.02% acid.
Plated after 24 hours	Typhoid 2%.	Reaction 4.7 % acid.
Plated after 48 hours	Typhoid 0%.	Reaction 6.8 % acid.

This and other experiments indicated that there is a reduction in the number of typhoid bacilli when the acidity rises above 3 per cent. In another experiment it was found that the time required to kill the bacilli is directly proportional to the number of typhoid bacilli present.

Summarizing, the typhoid bacillus is gradually killed in sour cream by the acids. The rate of destruction is proportional to the degree of acidity and number of organisms present. In sour cream from which the normal flora has not been removed, the disappearance of typhoid bacilli is due in part to overgrowth of the typhoid bacillus by these bacteria. "With a moderate contamination, the typhoid bacilli are killed in about four days. With a heavy contamination or where initial multiplication has taken place, a longer time may be required." A clean cream which soured slowly is dangerous, as an initial multiplication would take place and the organisms would be destroyed slowly.

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*Abstracted, The American Journal of Public Health, 1914.

A Year's Experience With Contagious Disease Nurses.*

The necessity for the control of contagious disease is based on two reasons:

First, the control of communicable disease is a matter of scientific exactness, and greater results are expected from this campaign than from other phases of public health work.

Second, the education of the public has progressed to such an extent that they demand the suppression of these diseases as a prerequisite to granting further support to health departments.

Previous to July 1, 1913, when a house (in Detroit) was placarded for contagious diseases, a quarantine inspector immediately visited the family to see they were properly supplied with necessities. His visits were continued from time to time as occasion demanded. At the termination of the illness, he disinfected the house and removed the placard. There were three such inspectors employed at a salary of $1,000 each. These men were faithful reliable men, but had no special training. This quarantine service was discontinued July 1, 1913. Twelve contagious disease nurses were employed at a yearly salary of $1,000 each. Placarding of houses is done by the police department. The same day the house is visited by a contagious disease nurse. If the patient goes to the hospital she disinfects the house. She determines the advisability of isolating the patient and allowing the wage-earner his freedom. A history of the case and family is made out. The nurse reads to the family the literature supplied by the board of health, and gives practical demonstrations of disinfection and the application of other principles mentioned. Other of her duties may be summarized as follows:

Keeping track of milk bottles,
Taking cultures for release,
Taking cultures from school children and suspicious cases,
Inspecting cases of scarlet fever prior to dismissal,
Aiding the attending physician, etc., etc.

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*Abstracted, The Journal of The American Medical Association, 1914.

A comparison of the deaths from contagious disease for the first five months of 1913 and 1914 shows the value of this method of administering quarantine:

	1913.	*1914.*	*Reduction in 1914.*
Diphtheria	128	71	57
Scarlet fever	89	27	62
Typhoid fever	53	19	34

Some Important Phases of Railway Sanitation.*

After calling attention to the immense numbers of people who patronize common carriers, the author discusses the sanitary phases of these carriers themselves. He states that the best train ventilation is by means of openings at each end of coaches. The end doors should have adjustable sashes and the sash in the rear door should always be open. A thermometer will usually show that the temperature is highest in the center of the coach, and on this account there should be two oscilating fans in the center of the coach in addition to one at each end, or English paddle fans should be installed every 15 feet.

Spitting, sneezing, and coughing on trains should be controlled by means of placards informing travelers how to manage these physiological functions without endangering others.

Ice is so carelessly handled by ignorant workers — "slid along a platform over tobacco spit and other unmentionable filth, laborers taking up the ice with their bare hands and dumping it into the drinking water" — that it is considered unwise to have ice in the water in the dining service. Dining cars should have folding wash bowls, but should not be provided with a toilet on account of the odor therefrom. Waiters should be carefully instructed to wash hands before serving all food, and this would be a good rule to follow in railroad lunch rooms where objectionable personal habits such as fixing the hair and picking the nose are common observations. A special set of printed instructions should be given to all tuberculous persons traveling on trains, and if possible, such persons should take a state room or a berth in the rear end of the car and have cuspidors and paper at hand.

Tipping on trains is severely condemned from several points of view, one of which is that it is a health menace. The train "butcher" or fruit vender with dirty hands and dirty linen is another menace.

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*Abstracted, J. A. M. A., 1914.

An instance is stated where such a vender sold fruit to a woman with a young child. In the course of a few days the child was brought to a surgeon with a very sore eye which proved to be gonorrheal ophthalmia. Frequent washing of hands and frequent medical examinations should be demanded of such persons, as well as all dining car employes.

The surprisingly small number of persons who use the train toilets for defecation purposes is called attention to. For instance, on one round trip from Chicago to St. Louis in which 493 passengers were carried, not a single person defecated, although much urine was voided. The writer believes that the constant jarring of the coaches inhibits the peristaltic action of the bowels in the vast majority of traveling people. It is also very difficult to find any evidence of human excrement along the railroad right of way which may be explained by the constant fanning of long freight trains and passenger trains which dries out the excrement. On the other hand an unusual amount of cattle manure, even along street and sidewalk crossings in cities and villages is to be found. Where sleepers stand over night a bucket should be placed under all hoppers. Cattle pens along the line should be kept clean and whitewashed.

Construction and surveying crews appear to have little attention given to them by railroads or boards of health in the matter of sanitation. Hundreds of these men leave their excretions on the right of way. Special rules have been laid down covering these workers. Camp cars are often filled with bed bugs and body lice, while smallpox and gonorrhea are prevalent among this class of laborers. Sanitary canvas beds which can be taken down, washed, sunned and aired, and eight of which are arranged in a box car with a window ventilator for each bed are described and pictured along with special rules for the care of such living quarters. Instead of privy vaults with buckets, the author believes that pure unslacked chloride of lime should be placed in the bottom of each vault to the extent of six inches, and the earth removed from the vault should be gradually put back into it each day or twice a week. When the vault is full this may be used as fertilizer. Such a vault is also odorless. For small shops along the road, incinerators for excreta can be made out of castaway engine grates, the addition of a little tar and kerosene keeping down odor. Toilets at railway stations are polluted especially by the townspeople who use them as public toilets and who seldom patronize the road. Towns should provide their own public toilets.

A word or two is said concerning the industrial hygiene of railroad shops, forging and blacksmithing quarters and the like. It is suggested that all of the general offices should be removed from proximity to the right of way, so that smoke, gas, noise, and nervous stress from the constant ringing of bells and blowing of whistles, and so on, may be eliminated as health hazards to the office workers.

A very valuable discussion on the article by eminent railway and other sanitarians is also given. Among these, Dr. W. C. Rucker, Washington, D. C., remarked that regulations had been made excluding from trains the common towel, the common drinking cup, and that it would not be very long until the common brush and comb were taken from the train, after which the next thing should be to abolish from trains the common hog or the person who has no sense of sanitary decency and who as a traveler is a menace to everyone else.

Rural Sanitation.

In 1909 the Commission on Country Life reported that "the farm should be the most heallthful place in which to live, and there are numberless farmhouses, especially of the farm-owner class, that possess most excellent modern sanitary conveniences. Still it is a fact that there are also numberless other farmhouses, especially of the tenant class, and even numerous rural schoolhouses, that do not have the rudiments of sanitary arrangement. Health conditions in many parts of the open country, therefore, are in urgent need of betterment."

The problem of rural sanitation calls for consideration from two points of view: that of the possible danger of objectionable surroundings and unhygienic practices to the individual on the farm and his immediate neighbors; and that of the menace which insanitary farm conditions may present indirectly to urban communities. The sanitary relation of the farm to the city involves almost entirely the possibility of the spread of actual infection from country to city through milk, meat, vegetables and other farm products. A few years ago it was not uncommon for farmers to meet with a spirit of resistance any suggestion of hygienic improvements which were planned to diminish the danger of the farm as a starting point for the spread of disease. At times there has actually been aggressive opposition to proposed regulations the object of which was defensible from every unbiased point of view. The milk industry could furnish many instances in recent times of actual refusal on the part of farm communities to supply an essential food to the market under conditions that to-day are everywhere accepted as rational and necessary.

A few years ago the apparent indifference of the rural community to the needs of the urban population dependent on the farm for a healthful food supply could be excused on the basis of ignorance. To-day there is no excuse for apathy toward the teachings of modern sanitation. The campaign of education that is being waged throughout the United States by all manner of forces — municipal, state and national — by agencies connected with the Public Health Service, the Department of Agriculture, the experiment stations, the state universities, boards of health, civic organizations and the public press ought to win its way into every rural home that has any ties whatever with civilized communities.

The better understanding of the farmer's unavoidable responsibility toward his distant fellow citizen has in turn reacted to advantage in respect to his own environment. As a recent writer has expressed it: Fortunately with the general advance in rural standards of living in recent years there has come about a considerable awakening of interest among farmers and representatives of rural communities along these lines, as well as among the public as a whole. Modern methods of communication and travel have to a great extent brought the rural districts into closer relationship with the towns and cities. The farmer learns of the improved general health and reduction in the death rate resulting from the decrease of the ravages of contagious disease, which has been brought about through the introduction of such preventive measures as a sanitary water supply, proper methods for the disposal of sewage and garbage, and mosquito and fly extermination, and wishes to avail himself of these benefits.

The country medical practitioner well realizes the futile idealism of much that emanates from an urban desk. Sometimes the most elementary sanitary conditions offer puzzling problems when the expense and feasibility of the proposed remedies are carefully studied. Too often the city reformer forgets the enforced monotony of diet, the lack of recreation and the excessive hours of work which farm conditions may entail in some sections and at certain seasons. There are social as well as economic forces involved in farm life, says *The Journal of the American Medical Association*. The reform of rural sanitation, which is undeniably called for in some parts of the United States, must not overlook the personal element so strong in the country dweller. With the exigencies of the situation kept in mind the campaign for improvement in rural sanitation is likely, in the words of a recent writer, to do much to make farm life at once more profitable, more healthful and more attractive, and by so doing contribute to safeguard the food supply, and therefore the health and the efficiency of the nation.

Increase in Insanity.

The Census Bureau, in a recent report, states that the number of insane reported in institutions increased from 150,151 in 1904 to 187,791 in 1910 — an increase of 25 per cent in six years. The total population in the same period increased only 12 per cent, thus showing the insane in institutions increased twice as fast as the population. In 1904, one person out of every 543 was confined to an institution for the insane; in 1910, one out of every 490. These increases, the report says, are at least partly attributable to the extension of the provisions made for the care of the insane. Of the 60,769 persons admitted to insane hospitals in 1910, 36,654 came from cities, villages or other incorporated places of more than 2,500 inhabitants, while 20,422 came from the smaller towns or country districts, leaving 3,673 for whom the place of residence was not reported. From rural communities forty-one insane persons were admitted per 100,000 population; from the urban communities the ratio was eighty-six per 100,000.

Our Knowledge of Cancer.

It is a curious trait of human psychology that while we accept with thanks a caution against slippery ice, a racing automobile, an ocean swim, and many hazards well known to involve mortal risk, custom and only custom rules against attention to the early signs of cancer. It is therefore the purpose and earnest endeavor of the American Society for the Control of Cancer, and all who are engaged in the campaign against malignant disease to modernize the custom in this respect and to establish a premium on that wary intelligence which will permit an educated man or woman to recognize the approach of danger and take the saving steps in time. Dr. Alfred Russell Wallace once said that the nineteenth century had done more than all previous time in the pursuit of knowledge essential to human welfare and had done less than any other time to make that knowledge available for human needs. The twentieth century begins with far more deliberate attention to this need. Intelligent people everywhere, and especially in America are more and more inclined to apply the standard of utility to the products of science. In choosing among the lines of scientific endeavor we ask and demand that their relation to human welfare should be prominently considered.

Not long ago an eminent association of specialists in cancer research publicly declared its belief that the new and old knowledge of this disease is not effectively employed and that it is not necessary to know all about the nature and causes of cancer in order to limit its mortality. These scientists before turning back to their laboratories to delve deeper into the mysteries of malignant disease, did not fail to discharge their immediate responsibility to the cause of human welfare. With whatever influence they possessed they urged the need of a country wide effort to disseminate the present knowledge of cancer, both in the medical profession and among the people generally. This call was characterized by a tacit assurance to medical and lay enthusiasts that we are not about to witness the miracle of a universal cure for advanced cancer, but may accomplish almost as much through prevention and through early diagnosis and treatment. The Society subsequently organized to carry on this campaign believes that every man and woman should be acquainted with the early signs of preventable and curable cancer, and that this knowledge when fully disseminated will very greatly reduce the number of deaths and the number of advanced cases.

There is much about cancer that is obscure. We do not know why the rebellious tissue cells grow wild and destroy their host. We may never know. Neither do we know the cause of graitation or chemical affinity. These are ultimate facts about Nature that are inaccessible to solution, but this ignorance does not prevent us from making considerable use of gravity and chemistry. What we do know about cancer are the conditions leading up to it and the proper use of this knowledge is a very small part of the subject but it is sufficient for the present to accomplish great results.

The fact of the greatest practical importance in our present knowledge of cancer is that the disease in its early stages is purely local and can be successfully removed from the system by surgical means. In the second place we know that irritation in many different ways plays a most important part in the development of the various forms of cancer. This knowledge gives an important direction to efforts toward prevention and cure. The sources of constant irritation to any part of the body should be removed.

In external cancer there is something to be seen or felt, such as a wart, a mole, a lump or scab, or an unhealed wound or sore. Pain is rarely present. Cancer inside the body is often recognized by symptoms before a lump can be seen or felt. Continuing indigestion, with loss of weight and change of color, is especially suspicious. Persistent abnormal discharge should arouse suspicion of cancer, particularly if the the discharge is bloody. The early and hopeful stages of cancer are usually painless.

Knowledge of cancer is truly the power to save life. If all patients would seek examination and competent advice immediately on the appearance of signs suggesting cancer and would submit to the simple and certain operation necessary to remove the disease the number of cures would be enormously increased. Alert intelligence and courage replacing present ignorance and fear would save the majority of sufferers from this disease.

Carcinophobia.

This is what the doctors, with their fondness for Latin and Greek names, would probably call a condition of morbid fear, apprehension and panic about cancer. A similar state of mind about consumption has been called "phthisiophobia." As somebody has probably said before, we have troubles enough already without worrying about those we might have. Yet a rational fear of disease is not an unwholesome thing. It means that our intelligence is wide-awake and ready to keep us out of trouble by watching the road ahead. And although the quack and the mystic are abroad in the land, it is a good omen that the average American common sense still relies on clear thinking and plain facts to light the way of life.

The Chicago Health Department *Bulletin* recently had some sound words on this subject. "There is no harm in any one having a wholesome fear of disease," it said. "As a matter of fact, fear very often plays an important part in protecting and conserving community health. But because people are very much afraid of some diseases, and almost indifferent about others, almost every community has a great deal of sickness that might be avoided." The article points out that while "fear of the intelligent, wholesome kind has been a most important factor in helping health authorities to control small-pox" the absence of the proper fear in regard to measles and whooping cough has doubtless contributed to the mischief and even the mortality caused by those neglected diseases.

Just now cancer is much to the forefront of public discussion. The American Society for the Control of Cancer and many prominent surgeons and leading newspapers are trying to make the people understand that cancer is a preventable and curable disease, but only if it is recognized early and removed from the body by timely operation. All this discussion will lead many persons to think about cancer who never thought about it before. Perhaps there is even some danger that it will cause something that might be called "carcinophobia." This would be not only needless but regrettable, for it would come about as a consequence of a very necessary campaign of education.

Only a wider knowledge of cancer can check the increasing death rate by bringing those afflicted to seek proper treatment in time. How far astray a mistaken fear of disease may lead some persons is shown by a patient with nosebleed, who recently went to a surgeon in some alarm and in complete misunderstanding of the warning that unnatural bleeding might be a symptom of cancer. Of course this patient was quickly reassured and no harm was done. But even if a few people are momentarily frightened, should this be considered when compared with the saving of one life? And there is certain proof that early courageous attention to the symptoms of malignant disease is daily saving men and women from suffering and from death in one of its worst forms.

Rubber as a Source of Danger.

Every one is interested in the chemistry of rubber because this material enters into numerous articles and devices of daily use. Experience teaches the unlike qualities of different types or brands of rubber. Some of them retain their original elasticity for a long time under the imposed conditions of usage, while others speedily deteriorate into brittle and useless scrap despite the various precautions of preservation that are embodied in familiar directions. The economic aspect of the quality of rubber goods offered for sale is an important one.

The time is arriving, says *The Journal of the American Medical Association,* when the purchaser of rubber will demand some reliable information as to the quality of the product which he is paying for. Rare, indeed, is the person at the present time who has any idea whatever of the make-up of rubber. Pure india-rubber, or caoutchouc, in its natural state is entirely unsuited for commercial use. It is soft and sticky, and readily undergoes spontaneous oxidation to a hard, brittle resinous substance. By vulcanization, a process in which mixtures of the crude gum with sulphur, or metallic sulphids or oxids are heated, a rubber is formed which is more permanently elastic and less subject to spontaneous change. The simplest type of vulcanized rubber, such as would be obtained from a properly heated mixture of sulphur and pure gum, is quite soft and offers little resistance to ordinary rough usage. Rubber of tougher quantities, but with lower elastic limits, is produced by the addition of metallic oxids, such as those of lead and of zinc, to the other ingredients before vulcanization. Among other constituents added to give required characteristics are the various pigments which furnish the color, Venetian red (iron oxid), ultramarine, lampblack and various organic dyes being among the ingredients which are employed.

A recent government report shows that a large number of materials are used in rubber compounding to reduce the cost. Among there are whiting, barytes, clay and various rubber substitutes, such as artificial rubber, oils and tar products. Finally, so-called recovered rubber, or shoddy, is used to a large extent in rubber compounds. In the case of most articles of rubber the existencee of filling materials, pigments, etc., has no hygienic import. Cost and durability are the chief concern of the purchaser. The use of various heavy metals in the manufacture of nursing-nipples and small rubber toys is a danger to the health of infants, who extract soluble products from such articles in the mouth or when small pieces of the rubber are accidentally swallowed.

The Public Health Service has lately investigated the rubber used in nipples and toys. All specimens examined contained iron and aluminum. In the red rubbers either zinc oxid or magnesia was used, in the black rubbers zinc oxid and barytes. Antimony was found in four cases out of seven among the black rubbers and in five cases out of eight among the red rubbers. The three remaining specimens of red rubber were colored with Venetian red. The white rubber toys contained clay, zinc oxid and barytes. The use of lead compounds in rubber preparations is common, and salts of mercury are used to some extent. Either of these metals would be highly objectionable in nipples or children's toys. The government report concludes: The articles should be made of a good grade of black rubber, free from shoddy and from antimony, lead, arsenic and mercury. Of the fillers commonly employed, magnesia, zinc oxid and clay are less undesirable, and barytes is probably without harmful influence. There can be no objection to a red rubber colored with iron oxid, although the advantages of such a compound will probably not compensate for the disadvantages of its being confused with antimony rubber.

The Social Status of Medical Practice.*

In an address with the above title before the graduating class of St. Louis University School of Medicine, Dean Lyon, of the Medical School of the University of Minnesota, has endeavored to indicate the forces that are to be seen at work changing the conditions surrounding the private practice of medicine.

It may be prophesied safely that no individual right, whether of property or person, will be allowed permanently to stand, which conflicts with the prosperity, happiness or health of the organized whole. The right of society to health is one of the latest rights to be recognized. The right and duty of society to secure and protect health are bound more and more to come to the front as prime motives in limiting the individual.

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*Abst. Jour. A. M. A., 1914.

Medicine began and has continued until recently quite strictly as an individualistic calling. It is today very largely a personal service. With the knowledge of the nature and cause of disease acquired in the last half century, a change has begun whose effects are already plainly perceptible and whose eventual far-reaching results over the profession no one can forsee at present. We know now that disease is never wholly an individual matter. Some diseases are predominantly social. Medicine is losing its individualism.

Some of the indications of this are the wonderful and far-reaching activity known as public health or preventive medicine. This movement finds its scientific foundation in Pasteur's demonstration of the cause of disease and the nature of infection. It finds its mathematical verification in vital statistics. It finds its financial justification in the value of the human animal. It finds its moral appreciation in the altruistic ideal of race welfare and community happiness.

Disease, crime, pauperism, insanity and preventable accidents are the foulest blots on the modern civilized state and the responsibility for the amelioration of these curses must be facd on the last analysis by the medical profession. Only by the painfully slow process of education will control over these be realized and in this education, the doctors must take the lead that the true function of medicine may be universally understood, namely, to keep people well.

Poverty and Sickness — Their Relationship to the Hospital.*

It is not difficult to find abundant evidence to prove either that much poverty is caused by sickness, or that much sickness is caused by poverty. It is generally agreed that the two causes interact mutually, and compose a vicious circle. Death, or sickness successful, is rarely due to poverty uncomplicated by sickness. Deaths from starvation, from poverty pure and simple, are all but unknown in civilized countries.

Sickness and poverty together touch the hearts of the well-to-do and impel them to provide for the less fortunate all the machinery for the treatment of sickness — doctors, hospitals, dispensaries and nurses. When the rich man is sick, he sends for a doctor, takes to his bed, or perhaps goes into a nursing home. When the poor man is ill, the rich man supplies him accordingly with a doctor and a hospital ward or out-patient department. But, whereas the rich man leaves the consulting room or the nursing home free to follow the advice given him and with a reasonable prospect of remaining in the health he has been enabled to regain, the poor man is discharged cured, or relieved, it may be, in the majority of cases, of his particular complaint for the time being; but so far as concerns his poverty, the primary or secondary cause of his illness is in the same state as when he came in. His poverty unrelieved, is bound to bring sickness in its train again and again and again, until at length death, the consummation of sickness, is achieved.

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*Abst. Modern Hospital, 1914.

When this event happens, all the money spent on his medical treatment is lost, not merely the expenditure on his final fatal illness, but as well that which has been expended, with temporary success, on his previous illness. It is certain that the number of sick, too poor to profit by medical and social assistance in every great city of the world, must be not inconsiderable.

Poverty due to low wages and irregular work can be abolished only by combined action. The causes in the first instance are social, not individual, and can be attacked only by social measures. Though hospitals, out of humanity, must continue their ministrations to the very poor, yet, until poverty is abolished or diminished by other means, chiefly social and economic, much of the money spent by them is lost.

Disease and Poverty.*

The normal person will not sink into poverty. Disease, deformity and weak-mindedness are sub-normal. Disease is itself not an evidence of physical or mental strength. Syphilis is a great cause of poverty, as it is also of insanity. Who must be told of the great poverty that trails consumption? Feeble-mindedness is a disease condition and produces a world of poverty. There is no cure for feeble-mindedness; it may only be prevented; and there are only two rational methods for its prevention, neither of which society will adopt. In this refusal, prevention is disregarded and disease follows civilization with its ever lengthening train of degeneracy, defectiveness, delinquency and dependency.

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* Abst. Jour. A. M. A., 1914.

Drugless Healers in the United States.

We are sometimes told that disease can, and should, be treated without drugs, and it is probable that at the present day not a few physicians use in their practice little in the way of medication beyond the mixture of hope and nux vomica in which the pharmacopoeia of a celebrated authority has been epigrammatically summed up. But in this, as in so many other departures form the old ways, America is far ahead. Not long ago a bill for the regulation of medical practice was before the California Legislature. We learn from the Pacific Medical Journal that with the fine catholicity that might be expected in a progressive State recognition was accorded in the proposed law to a motley crowd of "drugless healers' 'and "wonder workers", as various as the beasts in St. Peter's vision. Provision was made for the admission of all these to examination for a "drugless practitioner's" certificate. Our contemporary gives the following "partial list" of healers eligible for a license after studying in their particular school for two years of 2,400 hours: "Absent treatment-paths, astrologists, astrological physicians, 'bloodless' healers, charlatanismus practors, chiropathists, mechano-therapeutists, mechanico-vibrationists, mentapaths, mental healers, mental scientists, mental telepathists, chiropodists, chiropractics, Christian science healers, clairvoyant healers, 'Cosmic Urge' physicians, crystal gazing physicians, damphoolismus healers, Divine healers, 'drugless' healers, 'drugless' physicians, electropaths, electro-therapeutists, electro-mechano-therapeutists, Emanuel-movementors, faith-healers, fakopaths, fraudopaths, gift healers, health healers, humbugopaths, humanitarianists, hydropaths, hydropathic physicians, lost-manhood professors, magnetopaths, magnetic-electric-physicians, magnetic doctors, meta-physicians, naprapaths, naturopathists, naturopathic physicians, neuropathic physicians, New Thought physicians, New Thought Healers, Newthoughtists, Oculopaths, osteopathists, oxypaths, palm-reading physicians, panopaths, psychic physicians, Psychic Soc Et Tuum, Pneuma-psycho-mana-somapaths, psycho-medical healers, phycho-paths, psychometropaths, psycho-therapeutists, quackopaths, spirit healers, spiritualistic healers, vibrationists, vitapaths, vitopathic physicians." This list is nearly as long and a good deal more varied than the catalogue of Don Giovanni's conquests. We join with the editor of the Pacific Medical Journal in asking for an intelligent definition of these terms. We do not know whether the bill became law, but in any case the amazing variety of

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* Abst. The British Medical Journal, 1914.

forms of irregular practice which flourish so rankly in California is very striking to the unimaginative British mind. Renan said that the only idea he could form of the infinite was derived from the contemplation of the pretensions of quacks. He might, we think, with greater reason have found it in the spectacle of human gullibility which accepts these pretensions as gospel truth.

Study of a Swimming Pool, With a Return Purification System.*

Where the cost of frequently changing the water in a swimming pool is prohibitive, where the time this would require would interfere with the use of the pool, and where an unlimited source of water is not available, return systems of purification of the water have been found to give satisfactory results. Sometimes hypochlorite is used in addition to the filtration; sometimes hypochlorite alone is used.

During the winter of 1913, J. F. Norton, of the Mass. Inst. of Technology made a sanitary investigation of the Cambridge, Mass., Y. W. C. A. pool, the results of which follow:

The water in this pool is supplied by an artesian well and the capacity of the tank is 55,000 gallons, eighteen hours being required to completely refill it. The purification system consists of a closed filter 6 ft. high and 4½ ft. in diameter, filled with quartz pebbles, through which the water is pumped at the rate of 50 gal. per minute. The water from the pool is treated automatically with alum (⅙ to ½ grain per gallon) before entering the filter. Filtration is carried on only during the day time, and the filter is cleaned once a day by reversing the current. The filtered water is passed through a heating coil, when necessary to keep the temperature at about 70° F.

At night the filter is shut off and one pound of hypochlorite dissolved in the water in the pool, the tank being then left undisturbed till morning. In the morning the sides and bottom are cleaned by a brush connected with a suction pump, and enough fresh water from the well is added to make up losses from the previous day due to splashing, etc.

At no time was any color or odor observed, except once a slight odor of chlorine. The hypochlorite treatment immediately reduces the number of bacteria and this number is kept down by this and the rest of the purification system to a reasonable limit for about four weeks. The same is true of the gas forming organisms. At the end of four weeks about the only organism left is the yellow bacillus which has been found to resist hypochlorite treatment. The tank is refilled about every four or five weeks.

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* Am. Jour. of Public Health, 1914.

The author is of the opinion that the two main factors in keeping the bacterial count low are the addition of the hypochlorite and the subsequent sedimentation over night followed by thorough cleaning.

Chlorides and nitrogen as free and albuminoid ammonia do not give a satisfactory index of pollution of such a pool. The amount of nitrogen present as nitrites served as an excellent index, however, the amounts found being directly proportional to the bacterial counts.

REPORT OF THE HYGIENIC LABORATORIES, OHIO STATE BOARD OF HEALTH, FOR THE MONTH ENDING DECEMBER 31, 1914.

Diphtheria: Positive 105, negative 281, atypical 18	404
Typhoid: Positive, 26, negative 32, atypical 14	72
Tuberculosis: Positive 57, negative 171	228
Rabies: Positive 11, negative 5, unsatisfactory 1	17
Malaria: Negative 1	1
Miscellaneous 11	11
Total diagnostic	733
Existing water supply 25, proposed water supply 13	38
Typhoid 34, quality 11	45
Columbus Tap 18	18
Total water	101
Total number of examinations classified as above	834

Date reported January 5, 1915.

MORBIDITY REPORT BLANKS DELAYED.

Some of the supplies for the new system of morbidity reports were not received from the Government printing office at Washington until late in January, and it was, therefore, impossible to send out the cards to the physicians or the envelopes to the health officers on time. All supplies will be sent out at the earliest possible date. Numerous inquiries have been made by health officers to which separate answers could not be made on account of pressure of other work. The monthly summary card should contain a complete report of all cases of the notifiable diseases for the month, and physicians should fill out a notification blank for each case reported since the first of the year.

NOTIFIABLE DISEASES REPORTED FOR DECEMBER.

Diphtheria.

Diphtheria was less prevalent during December than during either of the preceding two months. Only 1,032 cases were reported as against 1,384 in October and 1,423 in November. No serious epidemics were reported. The following cities reported twenty or more cases: Cleveland 288, Cincinnati 125, Toledo 41, Columbus 39, Dayton, 33, Youngstown 27, and Akron 24.

Measles.

Several serious epidemics of measles were reported during December. Putnam County reported 155 cases, nearly all of which were in the villages of Glandorf, Miller City and Continental and in neighboring townships. Trimble Township and Trimble Village, Athens County reported 47 cases; Highland Township, Defiance 41 cases; Salem 53 cases and Wauseon 29. The total number of cases reported for the month was 552.

Scarlet Fever.

In 1913 the greatest number of cases of Scarlet Fever was reported in October, but in 1914 the October figures were exceded by those of November, and December shows a still further increase, 953 cases having been reported. The most serious epidemics were reported from Delaware 22 cases, Wooster 15 cases with 5 deaths, Pleasant Township, Fairfield County 15 cases, German Township, Montgomery County 14 cases, and Mary Ann Township, Licking County 11 cases. Of the larger cities, Cleveland reported 68 cases, Columbus 47, Cincinnati 46, Canton 25 and Akron 20.

Chickenpox.

This was the most prevalent of the notifiable diseases for the month of December 1.134 cases having been reported. Vericella was reported from nearly every county in the state. Cleveland reported 113 cases, Cincinnati 95. Dayton 67, Springfield 66, Newark 39, Toledo 34, DeGraff, Logan County 29, Lowell, Washington County 25, Norwood 22 and East Cleveland 21.

Whooping Cough.

Only 258 cases were reported in December. The only health districts reporting serious epidemics were Vermilion Township, Ashland County 20 cases. and Richland Township, Darke County 21 cases.

Typhoid Fever.

Comparatively few cases of winter typhoid fever were reported for December, the number being 225 as compared with 349 in November and 395 in December 1913. There were no serious epidemics except in Porter Township, Delaware County which reported 11 cases. Cleveland reported 23 cases, Cincinnati 11, Dayton 8, Akron 7, and Mansfield and Lorain each 6.

Smallpox.

Practically the same number of smallpox cases were reported in December as in November, — 316 as compared with 319 in the previous month. The most serious epidemics were still in Canton, 58 cases, and Marseilles, Wyandot County, village 4 cases, township 38 cases. Geneva, Ashtabula County reported 26 cases with 11 more in the township. Sandusky reported 23 cases, East Liverpool 15, Mt. Vernon 12 with 1 death, and Conneaut and vicinity 13 cases.

Acute Anterior Poliomyelitis.

Only three cases of infantile paralysis were reported in December. These were from Oak Hill, Jackson County, Pickaway Township, Pickaway County (reported by the Circleville Health Officer) and Akron, Summit County. The first two cases resulted in death.

Epidemic Cerebrospinal Meningitis.

Cases were reported from Cincinnati, 5 cases, Cleveland 1, Bellaire 1, Middletown 1 and Akron 1.

Ophthalmia Neonatorum.

Cases reported from Cleveland 44 cases, Toledo 3, Akron 3, Cincinnati 2, Youngstown 2, Zanesville 2, Chagrin Falls, Cuyahoga County 1, Green Township, Harrison County 1, Paint Township, Highland County 1, Leipsic, Putnam County 1, — Total 60.

Trachoma.

Cases reported as follows: Cincinnati 15, Cleveland 3, Toledo 2, Akron 1, Loudonville, Ashland County 1, Perry Township, Montgomery County 1, — Total 23.

COMMUNICABLE DISEASES, DECEMBER 1914.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914.†

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	ADAMS COUNTY—									
2	Winchester *Vil.*		1							
3	Bratton *Tp.*			1						
4	Jefferson *Tp.*	1					3		2	
5	Liberty *Tp.*					3				
6	Oliver *Tp.*						2			
7	Spriggs *Tp.*								1	
8	Tiffin * *Tp.*								1	
9	ALLEN COUNTY—									
10	Delphos	2			8		2			
11	Lima					9	12		1	1
12	Harrod *Vil.*								1	
13	Jackson *Tp.*						7			
14	ASHLAND COUNTY—									
15	Ashland					1				
16	Loudonville *Vil.*					1	2			
17	Perrysville *Vil.*					2				
18	Clear Creek *Tp.*							2		
19	Orange *Tp.*						9			
20	Perry *Tp.*					1	12			
21	Vermilion *Tp.*							20		
22	ASHTABULA COUNTY—									
23	Ashtabula			6		5				
24	Conneaut			3		3				3
25	Geneva *Vil.*									26
26	Jefferson *Vil.*						2			
27	Conneaut *Tp.*									6
28	Geneva *Tp.*									11
29	Harpersfield *Tp.*			6						
30	Monroe *Tp.*			1						4
31	Plymouth *Tp.*	1								
32	Rome *Tp.*						6			
33	Saybrook *Tp.*	1								
34	Trumbull * *Tp.*									2
35	ATHENS COUNTY—									
36	Athens			1						
37	Nelsonville			6		1				
38	Coolville * *Vil.*							6		
39	Trimble *Vil.*				12					
40	Alexander *Tp.*	1			1					
41	Athens *Tp.*					1				
42	Carthage *Tp.*			1						
43	Dover *Tp.*				4			3		
44	Lee *Tp.*			1	2					
45	Rome *Tp.*				4					
46	Trimble *Tp.*			1	35		2	2		
47	Troy * *Tp.*							8		
48	York *Tp.*			8						
49	AUGLAIZE COUNTY—									
50	St. Marys					3				
51	Wapakoneta			1						
52	Minster *Vil.*								1	
53	Logan *Tp.*					1				
54	Noble *Tp.*					1				
55	St. Marys *Tp.*					2	3			
56	Washington *Tp.*					1				

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COMMUNICABLE DISEASES, DECEMBER 1914 — Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914. †

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	BELMONT COUNTY—									
2	Bellaire	2		10		1	1		5	1
3	Martins Ferry			5			1			
4	Barnesville *Vil.*						2		1	
5	Bridgeport *Vil.*			3						
6	Brookside *Vil.*						1			
7	Flushing *Vil.*	1								
8	Morristown *Vil.*						1			
9	Shadyside *Vil.*					2				1
10	Colerain *Tp.*		2	3		1				
11	Flushing *Tp.*				1				1	
12	Pultney *Tp.*			1		1				
13	Somerset *Tp.*						2			
14	Warren *Tp.*			2						
15	Wayne *Tp.*							11		
16	BROWN COUNTY—									
17	Higginsport *Vil.*	1								
18	Ripley *Vil.*	1								
19	Green *Tp.*								1	
20	BUTLER COUNTY—									
21	Hamilton	5		1		2		4		
22	Middletown			3		4				
23	Oxford *Vil.*						1			
24	Hanover *Tp.*			1						
25	CARROLL COUNTY—									
26	Malvern						1			
27	Brown *Tp.*						2			
28	Harrison *Tp.*			1		7				
29	CHAMPAIGN COUNTY—									
30	Urbana								2	
31	Mechanicsburg * *Vil.*			1						
32	North Lewisburg *Vil.*					6				
33	Mad River *Tp.*						5			
34	Rush *Tp.*					8				2
35	Salem *Tp.*						4			
36	Urbana *Tp.*				1					
37	Wayne * *Tp.*						1			
38	CLARK COUNTY—									
39	Springfield	1		11		3	66	10	3	
40	Madison *Tp.*			1						
41	Moorefield *Tp.*					1				
42	Springfield *Tp.*			1		2				
43	CLERMONT COUNTY—									
44	Bethel *Vil.*						2		2	
45	Ohio * *Tp.*								1	
46	Tate *Tp.*						6			
47	Union *Tp.*					1				
48	CLINTON COUNTY—									
49	Sabina *Vil.*			3		5				
50	Wilmington *Vil.*			2						
51	Chester *Tp.*						2			
52	Wilson * *Tp.*			1		2				
53	COLUMBIANA COUNTY—									
54	East Liverpool			5		11	8			15
55	Salem	2			58	1	8			
56	Wellsville						6		3	4
57	Leetonia *Vil.*						2			
58	Lisbon *Vil.*			2						

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COMMUNICABLE DISEASES, DECEMBER 1914—Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914. †

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	COLUMBIANA COUNTY—Concluded.									
2	Salinevile *Vil.*					1	3			2
3	Butler * *Tp.*						5			
4	Center *Tp.*			3						
5	Elk Run * *Tp.*			1						
6	Franklin *Tp.*	1					12		1	
7	Liverpool *Tp.*			3						
8	Washington *Tp.*		2						2	4
9	Wayne *Tp.*			1						
10	Yellow Creek *Tp.*									1
11	COSHOCTON COUNTY—									
12	Coshocton					1			1	
13	Plainfield *Vil.*					1				
14	Roscoe * *Vil.*			1						
15	Crawford * *Tp.*			1		1				
16	Franklin *Tp.*			2						
17	Newcastle *Tp.*				1					
18	CRAWFORD COUNTY—									
19	Bucyrus				1				1	1
20	Galion	1								
21	Lykens *Tp.*								1	
22	Polk *Tp.*			1		4				
23	CUYAHOGA COUNTY—									
24	Cleveland	95	3	288	10	68	113	32	23	2
25	East Cleveland			3		3	21			
26	Lakewood			2		6	2		4	
27	Berea			1						
28	Brooklyn Heights *Vil.*					1				
29	Chagrin Falls *Vil.*						2			
30	Cleveland Heights *Vil.*						3			
31	Euclid *Vil.*			1						
32	North Olmsted *Vil.*									2
33	West Dover *Vil.*					2				
34	West Park *Vil.*			5						
35	Newburgh Heights *Vil.*			2						
36	Euclid *Tp.*						2			
37	Middleburg *Tp.*			2						
38	Parma *Tp.*								1	
39	Royalton *Tp.*						8			
40	Strongsville *Tp.*	1				2		5		
41	DARKE COUNTY—									
42	Greenville					2		10		
43	Ithaca *Vil.*						1			
44	Union City *Vil.*			4						
45	Versailles *Vil.*					2				
46	Yorkshire * *Vil.*								1	
47	German *Tp.*					2		3		
48	Harrison *Tp.*					1				
49	Jackson *Tp.*			2						
50	Richland *Tp.*							21		
51	Twin *Tp.*		1							
52	Wabash *Tp.*					1				
53	Wayne *Tp.*					4				2
54	DEFIANCE COUNTY—									
55	Defiance	1			2	2	2			
56	Highland *Tp.*				41					
57	Mark *Tp.*						4			
58	Tiffin * *Tp.*			2						
59	Washington *Tp.*								2	

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COMMUNICABLE DISEASES, DECEMBER 1914 — Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914. †

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	**DELAWARE COUNTY—**									
2	Delaware *			1		22				
3	Berkshire *Tp.*			6					1	
4	Berlin *Tp.*			2		9				
5	Delaware *Tp.*					2	1			
6	Porter *Tp.*								11	
7	Radnor *Tp.*				1	1				
8	Scioto *Tp.*					8				
9	Thompson *Tp.*						1			
10	**ERIE COUNTY—**									
11	Sandusky	3		2	1	1	1		3	23
12	Kelleys Island *Vil.*					1				
13	Vermilion *Vil.*						1			
14	Berlin *Tp.*					3				
15	Groton *Tp.*					3				
16	Huron *Tp.*						2			2
17	Margaretta *Tp.*									2
18	Oxford *Tp.*	1	1							
19	**FAIRFIELD COUNTY—**									
20	Lancaster			8		7				
21	Rushville *Vil.*		1							
22	Clear Creek *Tp.*			1						
23	Madison *Tp.*			1		5				
24	Pleasant *Tp.*					15	10			
25	Richland * *Tp.*						10			
26	Walnut *Tp.*	1						3		
27	**FAYETTE COUNTY—**									
28	Washington C. H.				1					
29	Green* *Tp.*	1				2				
30	**FRANKLIN COUNTY—**									
31	Columbus	73		39	5	47	58	9	2	
32	Bexley					1				
33	Grandview Heights * *Vil.*			1						
34	Reynoldsburg *Vil.*	1				1			1	
35	Westerville *Vil.*			1		1	2			
36	Blendon *Tp.*			2						
37	Franklin *Tp.*			2			1			
38	Perry * *Tp.*		1							
39	Sharon *Tp.*					1	4			
40	**FULTON COUNTY—**									
41	Metamora *Vil.*					7	1			
42	Swanton *Vil.*				5					
43	Wauseon *Vil.*				29		1		1	
44	Franklin *Tp.*							12		
45	Pike *Tp.*						8			
46	Swan Creek * *Tp.*				2					
47	**GALLIA COUNTY—**									
48	Cheshire *Tp.*					2				
49	Guyan *Tp.*								3	
50	Huntington *Tp.*	1								
51	Ohio *Tp.*								2	
52	**GEAUGA COUNTY—**									
53	Auburn * *Tp.*			1						
54	Huntsburg *Tp.*						4			
55	Montville *Tp.*							1		
56	Newberry *Tp.*					4				
57	**GREENE COUNTY—**									
58	Clifton *Vil.*			2						
59	Jamestown *Vil.*					1				

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COMMUNICABLE DISEASES, DECEMBER 1914 — Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914.†

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	GREENE COUNTY—Concluded.									
2	Cedarville *Tp.*					2				
3	Miami *Tp.*			2						
4	Sugar Creek *Tp.*					1				
5	GUERNSEY COUNTY—									
6	Cambridge		1			11			8	
7	Byesville *Vil.*			2		1				
8	Lore City *Vil.*					2				
9	Senecaville *Vil.*			2						
10	Cambridge *Tp.*					2				
11	Center *Tp.*					4				
12	Jackson *Tp.*			4		1				
13	Londonderry * *Tp.*							1	1	
14	Richland *Tp.*			2						
15	HAMILTON COUNTY—									
16	Cincinnati	101	4	125	6	46	95	10	11	
17	Norwood	5		1		1	22	1	1	
18	St. Bernard					2				
19	Cleves *Vil.*			3	1	2				
20	Harrison * *Vil.*					1				
21	Lockland *Vil.*	1		1						
22	Madeira *Vil.*							2		
23	Deer Park *Vil.*							2	1	
24	Delhi *Tp.*	1				1				
25	Springfield *Tp.*			1		2				
26	Whitewater *Tp.*			1						
27	HANCOCK COUNTY—									
28	Findlay				2	9	1		1	
29	Amanda * *Tp.*					3				
30	Big Lick *Tp.*								2	
31	Delaware *Tp.*							2		
32	Portage *Tp.*						2			
33	Washington *Tp.*			1						
34	HARDIN COUNTY—									
35	Ada *Vil.*			2						
36	Agler *Vil.*								1	
37	Ridgeway *Vil.*							8		1
38	Blanchard *Tp.*					1				
39	Hale * *Tp.*			1						1
40	McDonald *Tp.*								1	
41	Pleasant *Tp.*									6
42	HARRISON COUNTY—									
43	Moorefield *Tp.*			2						
44	Washington * *Tp.*						5			
45	HENRY COUNTY—									
46	Holgate *Vil.*				3					
47	Malinta *Vil.*						18			
48	Flat Rock *Tp.*				18					
49	Pleasant *Tp.*				5					
50	HIGHLAND COUNTY—									
51	Hillsboro			1						
52	Leesburg *Vil.*				2		6			
53	Marshall * *Tp.*		1							
54	Liberty *Tp.*			1						
55	Paint *Tp.*					5	8			
56	Penn *Tp.*					3	2			

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COMMUNICABLE DISEASES, DECEMBER 1914—Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914.†

	Health District.		Tuberculosis.							
			Pulmonary.	Other forms.	Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
1	HOCKING COUNTY—										
2	Logan	*Vil.*					2				
3	Salt Creek	*Tp.*						8			
4	Starr	*Tp.*			1			3			
5	HOLMES COUNTY—										
6	Millersburg	*Vil.*								1	
7	Hardy	*Tp.*			1						
8	Berlin	*Tp.*				1					
9	Paint	*Tp.*			1						
10	Prairie	*Tp.*						15			
11	Walnut Creek *	*Tp.*			1						
12	HURON COUNTY—										
13	Bellevue		1				2				
14	Norwalk				1	1				1	
15	Fairfield	*Tp.*			1						
16	Greenwich	*Tp.*								1	
17	Norwich	*Tp.*					2				
18	Sherman	*Tp.*					4				
19	JACKSON COUNTY—										
20	Jackson				2						
21	Wellston				2		3				
22	Jackson	*Tp.*						4			
23	Lick	*Tp.*			5						
24	Milton	*Tp.*			4						
25	Scioto	*Tp.*			1						
26	JEFFERSON COUNTY—										
27	Steubenville		1		12	1	5	2		4	
28	Amsterdam	*Vil.*					3				
29	Bergholz	*Vil.*			1						
30	Empire	*Vil.*			2		2				
31	Mingo Junction	*Vil.*			1						
32	Toronto	*Vil.*			5				1	4	
33	Knox	*Tp.*			8					4	
34	Mt. Pleasant	*Tp.*					1				
35	Salem	*Tp.*					2				
36	Saline	*Tp.*			2						
37	Steubenvile	*Tp.*			5						
38	KNOX COUNTY—										
39	Mt. Vernon						1	8			12
40	Danville *	*Vil.*						8			
41	Berlin	*Tp.*					1				
42	Clinton	*Tp.*					8				8
43	Hilliar	*Tp.*					3				
44	Monroe	*Tp.*					1				
45	Pike	*Tp.*					1				
46	Pleasant	*Tp.*					8				
47	LAKE COUNTY—										
48	Madison	*Vil.*			3						
49	Mentor	*Vil.*			1			1			
50	Concord *	*Tp.*			3						
51	Madison	*Tp.*									4
52	Mentor	*Tp.*									1
53	Painesville	*Tp.*									2
54	LAWRENCE COUNTY—										
55	Ironton				2		2	5			
56	Coal Grove	*Vil.*			1						
57	South Point	*Vil.*				1					
58	Elizabeth	*Tp.*									1

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COMMUNICABLE DISEASES, DECEMBER 1914—Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914. †

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	LAWRENCE COUNTY—Concluded.									
2	Fayette* ...... *Tp.*	......	......	1	......	......	......	......	......	......
3	Perry ...... *Tp.*	1	......	......	......	2	......	......	......	......
4	Washington ...... *Tp.*	......	......	......	1	......	......	......	......	......
5	Windsor ...... *Tp.*	......	......	......	......	2	......	......	......	......
6	LICKING COUNTY—									
7	Newark	......	......	3	1	8	39	......	2	......
8	Johnstown * ...... *Vil.*	......	......	......	......	1	......	......	......	......
9	Utica ...... *Vil.*	......	......	......	......	1	......	......	......	......
10	Bennington ...... *Tp.*	......	......	......	......	3	......	......	......	......
11	Burlington ...... *Tp.*	......	......	1	......	3	2	......	......	......
12	Hartford ...... *Tp.*	......	......	......	......	2	......	......	......	......
13	Madison * ...... *Tp.*	......	......	1	......	......	3	......	......	......
14	Mary Ann ...... *Tp.*	......	......	......	......	11	11	......	......	......
15	Newton ...... *Tp.*	......	......	......	......	3	......	......	......	......
16	LOGAN COUNTY—									
17	Bellefontaine	1	......	1	2	1	5	......	1	......
18	DeGraff ...... *Vil.*	......	......	......	......	......	29	......	......	......
19	Huntsville ...... *Vil.*	......	......	......	......	......	1	......	......	......
20	Harrison ...... *Tp.*	......	......	......	1	......	......	......	......	......
21	Jefferson ...... *Tp.*	......	......	......	4	6	......	......	......	......
22	McArthur ...... *Tp.*	1	......	......	......	......	3	......	......	......
23	Monroe ...... *Tp.*	......	......	......	......	......	4	......	......	......
24	Perry ...... *Tp.*	......	......	......	......	8	2	......	......	......
25	Pleasant ...... *Tp.*	......	......	......	......	......	2	......	......	......
26	LORAIN COUNTY—									
27	Elyria	......	......	4	......	2	3	......	......	......
28	Lorain	......	......	11	1	5	12	......	6	......
29	Amherst ...... *Vil.*	......	......	4	......	......	......	......	......	......
30	Wellington ...... *Vil.*	......	......	......	......	1	......	......	......	......
31	Columbia ...... *Tp.*	......	......	......	......	......	......	1	......	......
32	La Grange ...... *Tp.*	......	......	1	......	......	......	......	......	......
33	Avon Lake ...... *Tp.*	......	......	......	1	......	1	......	......	......
34	LUCAS COUNTY—									
35	Toledo	42	......	41	30	11	34	1	4	......
36	Sylvania ...... *Vil.*	......	......	1	......	......	......	......	......	......
37	Waterville ...... *Vil.*	......	......	......	......	2	......	......	......	......
38	Adams ...... *Tp.*	......	......	1	......	......	......	......	......	......
39	Washington * ...... *Tp.*	......	......	......	......	......	......	......	1	......
40	MADISON COUNTY—									
41	London ...... *Vil.*	......	......	......	......	2	......	......	......	......
42	South Solon ...... *Vil.*	......	......	......	......	......	......	......	1	......
43	Deer Creek * ...... *Tp.*	......	......	......	......	2	......	......	......	......
44	Monroe ...... *Tp.*	......	......	......	......	......	1	......	......	......
45	Somerford * ...... *Tp.*	......	......	2	......	......	......	......	......	......
46	MAHONING COUNTY—									
47	Youngstown	5	......	27	3	13	......	1	4	1
48	Canfield ...... *Vil.*	......	......	......	......	......	2	......	......	......
49	East Youngstown ...... *Vil.*	......	......	......	......	5	4	......	......	......
50	Sebring ...... *Vil.*	......	......	......	......	......	......	......	1	......
51	Struthers ...... *Vil.*	......	......	......	......	......	5	......	......	......
52	Austintown * ...... *Tp.*	......	......	......	......	......	......	......	1	......
53	Berlin ...... *Tp.*	......	......	......	1	......	14	......	......	......
54	Boardman ...... *Tp.*	......	......	1	......	......	......	......	......	......
55	Canfield ...... *Tp.*	......	......	......	1	......	......	......	......	......
56	Coitsville ...... *Tp.*	......	......	......	......	1	......	......	......	......
57	Poland ...... *Tp.*	......	......	......	......	......	3	......	......	......
58	Springfield ...... *Tp.*	......	......	......	......	......	1	......	......	......

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COMMUNICABLE DISEASES, DECEMBER 1914 — Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914. †

	Health District.		Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
			Pulmonary.	Other forms.							
1	MARION COUNTY—										
2	Marion				7		1	9			5
3	Caledonia	*Vil.*					1				
4	Morral	*Vil.*									3
5	Big Island	*Tp.*					1				
6	Grand	*Tp.*									2
7	Marion	*Tp.*			1						
8	Montgomery	*Tp.*	1							1	1
9	Scott	*Tp.*					4				
10	Tulley	*Tp.*					1				
11	MEDINA COUNTY—										
12	Lodi	*Vil.*								3	
13	Medina	*Vil.*				1		2		1	
14	Harrisville	*Tp.*							1		
15	MEIGS COUNTY—										
16	Middleport	*Vil.*					1				
17	Bedford *	*Tp.*			1						
18	Rutland	*Tp.*					6				
19	MERCER COUNTY—										
20	Celina *	*Vil.*			6						
21	Coldwater	*Vil.*			4					1	
22	Fort Recovery	*Vil.*			1					1	
23	Mendon	*Vil.*		1							
24	Montezuma	*Vil.*					4				
25	Rockford	*Vil.*	1						8		
26	Butler	*Tp.*			5						
27	Center	*Tp.*		1							
28	Franklin	*Tp.*					4				
29	Granville	*Tp.*			1					2	
30	Marion	*Tp.*			1					2	
31	MIAMI COUNTY—										
32	Piqua						4	6		1	
33	Troy				6		1				
34	Tippecanoe City	*Vil.*			1						
35	Milton	*Vil.*					1			1	
36	Elizabeth	*Tp.*					1		4		
37	Staunton	*Tp.*					2				
38	Union	*Tp.*							3		
39	MONROE COUNTY—										
40	Clarington *	*Vil.*								1	
41	Ohio	*Tp.*					4				
42	Sunsbury *	*Tp.*					1	3			
43	Wayne *	*Tp.*		1				1			
44	MONTGOMERY COUNTY—										
45	Dayton		14		33	29	27	67	1	8	
46	Germantown	*Vil.*				1	1				
47	Miamisburg	*Vil.*					1				
48	Butler	*Tp.*					1				
49	German	*Tp.*			2		14				
50	Harrison	*Tp.*			1		1				
51	Perry *	*Tp.*			1						
52	Van Buren	*Tp.*			4						
53	Wayne	*Tp.*					1				
54	MORGAN COUNTY—										
55	Center	*Tp.*						1			
56	MORROW COUNTY—										
57	Cardington	*Vil.*						1			
58	Edison	*Vil.*	1								
59	Mt. Gilead	*Vil.*		1							

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COMMUNICABLE DISEASES, DECEMBER 1914—Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914.†

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping-Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	MORROW COUNTY—Concluded.									
2	Bennington Tp.	1								
3	Lincoln Tp.			1						
4	Troy Tp.			1						
5	Washington Tp.					1				
6	Westfield Tp.			2						
7	MUSKINGUM COUNTY—									
8	Zanesville	1		4	1	8	1		2	
9	Frazeysburg Vil.				3					
10	New Concord Vil.					6				
11	Roseville * Vil.					1				
12	South Zanesville Vil.					3	2			
13	Taylorsville Vil.					1	4			
14	Licking Tp.			1						
15	Monroe Tp.					1				
16	Newton Tp.				1					
17	Perry Tp.					2				
18	Washington Tp.							5		
19	Wayne Tp.			1						
20	OTTAWA COUNTY—									
21	Marblehead Vil.			2						
22	Port Clinton Vil.					3				
23	Rocky Ridge Vil.					1				
24	Allen Tp.					4				
25	Bay Tp.					1				
26	Danbury Tp.					1				
27	Erie Tp.								1	
28	Harris * Tp.						7			
29	Salem Tp.	1								
30	PAULDING COUNTY—									
31	Antwerp Vil.								1	
32	Paulding Vil.				1	1				4
33	Auglaize Tp.						2			
34	Carryall * Tp.								1	
35	Jackson Tp.			1						1
36	Latty Tp.			1						
37	PERRY COUNTY—									
38	Crooksville Vil.					2				
37	Rendville Vil.			2						
40	Harrison Tp.					5				
41	Monday Creek Tp.			1						
42	Pleasant Tp.					1				
43	Reading Tp.					3			1	
44	Thorn Tp.	1								
45	PICKAWAY COUNTY—									
46	Ashville Vil.			1				1		
47	Darby Tp.					1	1		4	
48	Jackson Tp.							3		
49	Pickaway Tp.					1				
50	Scioto Tp.					1				
51	Washington Tp.						17			
52	PORTAGE COUNTY—									
53	Ravenna			3	1	2				
54	Garrettsville Vil.					1				
55	Kent Vil.			2	1	2				
56	Aurora Tp.								1	
57	Deerfield Tp.					2		3		
58	Franklin Tp.			1						

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COMMUNICABLE DISEASES, DECEMBER 1914 — Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914. †

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	PORTAGE COUNTY— Concluded.									
2	Mantua *Tp.*			1		1				
3	Nelson *Tp.*					1				
4	Palmyra *Tp.*						10			
5	PREBLE COUNTY—									
6	Eaton *Vil.*			2		1				
7	Lewisburg *Vil.*				4					
8	New Paris *Vil.*								4	
9	West Alexandria *Vil.*			3		2				
10	Harrison *Tp.*					1			2	
11	Israel *Tp.*							8		
12	Jefferson *Tp.*								2	
13	Lanier *Tp.*			4		5				
14	Somers *Tp.*				1		3			
15	Twin *Tp.*			1		1				
16	PUTNAM COUNTY—									
17	Columbus Grove *Vil.*								1	
18	Continental *Vil.*				13					
19	Glandorf *Vil.*				50					
20	Leipsic					11	4			
21	Miller City *Vil.*				35					
22	Ottawa *Vil.*					3				
23	Blanchard *Tp.*				1					
24	Greensburg *Tp.*				27					
25	Monterey *Tp.*					2				
26	Palmer *Tp.*				25					
27	Pleasant *Tp.*								1	
28	Union *Tp.*				3				1	
29	Van Buren *Tp.*				1	6				
30	RICHLAND COUNTY—									
31	Mansfield			6		4			6	
32	Lexington *Vil.*					6				
33	Cass *Tp.*								1	
34	Madison *Tp.*						1			
35	Sandusky *Tp.*					3				
36	Washington * *Tp.*					7				
37	ROSS COUNTY—									
38	Chillicothe	6		4		2				
39	Adelphi *Vil.*			1					1	
40	Buckskin *Tp.*			1						
41	Green *Tp.*	2								
42	Harrison *Tp.*			8						
43	Liberty *Tp.*			1		2				
44	Scioto * *Tp.*			4						
45	Springfield *Tp.*	1		2				2		
46	Twin *Tp.*							4		
47	SANDUSKY COUNTY—									
48	Fremont			1		3	18			8
49	Clyde *Vil.*					8				
50	Burgoon *Vil.*					3				
51	Ballville *Tp.*						6			
52	Riley *Tp.*				2					
53	Sandusky *Tp.*								3	
54	SCIOTO COUNTY—									
55	Portsmouth	7		3		4			3	
56	New Boston *Vil.*	2						6		
57	Rarden *Vil.*							5		

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COMMUNICABLE DISEASES, DECEMBER 1914 — Continued.

This table records all cases reported by Health Officers to the State Board of Health for the month of December, 1914. †

	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	SCIOTO COUNTY—Concluded.									
2	Clay Tp.			1						
3	Nile Tp.						4		3	
4	Rarden Tp.							3		
5	SENECA COUNTY—									
6	Fostoria			5		1				8
7	Tiffin			8			1	7	1	
8	Big Spring Tp.			1						
9	Clinton Tp.			1						
10	Jackson Tp.					1				
11	Liberty Tp.			1				1		
12	SHELBY COUNTY—									
13	Sidney					1			1	
14	Orange Tp.					1				
15	STARK COUNTY—									
16	Alliance			4	1	1	4			
17	Canton	1		3		25	7			58
18	Massillon			5			1		1	
19	Beach City Vil.					4				
20	Osnaburg Vil.									2
21	Waynesburg Vil.						1			
22	Canton Tp.					1				
23	Jackson Tp.						1			
24	Lake Tp.					3				7
25	Lexington Tp.									1
26	Marlboro Tp.								3	
27	Nimishillen Tp.					1				1
28	Osnaburg Tp.	1								
29	Perry * Tp.			1						
30	Sandy Tp.						1			
31	Tuscarawas Tp.	1		1	29	2				
32	SUMMIT COUNTY—									
33	Akron	3		24		20	15		7	
34	Barberton			2		2				
35	Cuyahoga Falls* Vil.			1					1	
36	Hudson Vil.			1						
37	Kenmore Vil.			1						
38	Clinton Vil.	1								
39	Copley Tp.								1	
40	Norton* Tp.			1						
41	Portage Tp.			1		1				
42	Stowe Tp.						1			
43	TRUMBULL COUNTY—									
44	Niles			1					1	
45	Warren			1		1				
46	Cortland Vil.						15			
47	Girard Vil.			2			4			
48	Newton Falls Vil.		1							
49	Orangeville Vil.					2				
50	Brookfield Tp.								1	
51	Hartford Tp.					2				
52	Hubbard Tp.	3								
53	Kinsman Tp.			1						
54	TUSCARAWAS COUNTY—									
55	Canal Dover			1		3	4			
56	New Philadelphia			1		2	13			
57	Bolivar Vil.						2			

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COMMUNICABLE DISEASES, DECEMBER 1914 — Continued.

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	Health District.		Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
			Pulmonary.	Other forms.							
1	**TUSCARAWAS COUNTY—Concluded.**										
2	Dennison	*Vil.*	.....	.....	6	.....	.....	.....	.....	.....	1
3	Newcomerstown	*Vil.*	.....	.....	.....	.....	8	.....	.....	.....	.....
4	Uhrichsville	*Vil.*	.....	.....	.....	.....	.....	.....	.....	.....	4
5	Dover	*Tp.*	.....	.....	.....	.....	4	.....	.....	.....	.....
6	Franklin	*Tp.*	.....	.....	.....	.....	1	.....	.....	.....	.....
7	Oxford	*Tp.*	.....	.....	.....	.....	2	.....	.....	.....	.....
8	Sandy	*Tp.*	.....	.....	.....	.....	.....	1	.....	.....	.....
9	**UNION COUNTY—**										
10	Marysville*	*Vil.*	.....	.....	.....	.....	5	.....	.....	.....	.....
11	Allen	*Tp.*	.....	.....	.....	.....	2	3	.....	.....	.....
12	Leesburg	*Tp.*	.....	.....	.....	.....	.....	2	.....	.....	.....
13	Liberty	*Tp.*	.....	.....	.....	.....	10	2	8	.....	.....
14	Millcreek	*Tp.*	.....	.....	.....	.....	9	.....	.....	.....	.....
15	Washington	*Tp.*	.....	.....	.....	.....	5	.....	.....	.....	.....
16	**VAN WERT COUNTY—**										
17	Van Wert		.....	.....	1	9	1	.....	.....	.....	.....
18	Willshire *	*Vil.*	.....	.....	.....	.....	.....	.....	5	.....	.....
19	Wren	*Vil.*	.....	.....	1	.....	4	.....	.....	.....	.....
20	Liberty	*Tp.*	.....	.....	.....	.....	2	2	.....	.....	.....
21	Ridge	*Tp.*	.....	.....	.....	1	3	.....	.....	.....	.....
22	York		.....	.....	.....	.....	.....	1	.....	.....	.....
23	**VINTON COUNTY—**										
24	Brown	*Tp.*	.....	.....	.....	.....	2	.....	.....	.....	.....
25	Vinton	*Tp.*	.....	1	.....	.....	.....	.....	.....	.....	.....
26	Wilkesville	*Tp.*	.....	.....	.....	.....	1	.....	.....	.....	.....
27	**WARREN COUNTY—**										
28	Franklin	*Vil.*	.....	.....	4	.....	1	.....	.....	.....	.....
29	South Lebanon	*Vil.*	.....	.....	1	.....	.....	.....	.....	1	.....
30	Massie	*Tp.*	1	.....	.....	.....	.....	.....	.....	.....	.....
31	Turtle Creek *	*Tp.*	.....	.....	2	.....	.....	.....	.....	.....	.....
32	**WASHINGTON COUNTY—**										
33	Marietta		.....	.....	1	.....	.....	.....	.....	.....	.....
34	Belpre	*Vil.*	.....	.....	.....	.....	.....	.....	.....	1	.....
35	Lowell	*Vil.*	.....	.....	.....	.....	2	25	.....	.....	.....
36	Ludlow	*Tp.*	.....	.....	1	.....	.....	.....	.....	.....	.....
37	Warren	*Tp.*	.....	.....	.....	1	.....	2	.....	.....	.....
38	Wesley	*Tp.*	.....	.....	.....	3	.....	.....	.....	.....	.....
39	**WAYNE COUNTY—**										
40	Wooster		.....	.....	.....	.....	15	2	.....	.....	8
41	Mt. Eaton	*Vil.*	.....	.....	1	.....	.....	.....	.....	.....	.....
42	Orrville	*Vil.*	.....	.....	2	.....	.....	.....	.....	.....	.....
43	Rittman	*Vil.*	.....	.....	1	.....	.....	.....	.....	.....	.....
44	Wayne	*Tp.*	.....	.....	.....	.....	2	.....	.....	.....	1
45	**WILLIAMS COUNTY—**										
46	Montpelier	*Vil.*	.....	.....	1	.....	.....	.....	.....	.....	.....
47	Stryker *	*Vil.*	3	.....	.....	.....	.....	.....	.....	.....	.....
48	St. Joseph	*Tp.*	.....	.....	1	.....	.....	.....	.....	.....	.....
49	**WOOD COUNTY—**										
50	Bowling Green		.....	.....	2	.....	.....	.....	.....	.....	7
51	Bloomdale	*Vil.*	.....	.....	.....	.....	.....	.....	.....	2	.....
52	Hoytville	*Vil.*	.....	.....	.....	.....	.....	.....	2	.....	.....
53	Pemberville	*Vil.*	.....	.....	.....	.....	1	.....	.....	.....	.....
54	Walbridge	*Vil.*	1	.....	.....	.....	.....	.....	.....	.....	.....
55	Henry	*Tp.*	.....	.....	.....	.....	.....	.....	2	.....	2
56	Liberty *	*Tp.*	.....	.....	.....	.....	1	.....	.....	.....	.....
57	Montgomery	*Tp.*	.....	.....	.....	.....	4	4	.....	.....	.....
58	Portage	*Tp.*	.....	.....	.....	.....	1	.....	.....	.....	.....

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COMMUNICABLE DISEASES, DECEMBER 1914 — Concluded.

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	Health District.	Tuberculosis.		Diphtheria and Membranous Croup.	Measles.	Scarlet Fever.	Chickenpox.	Whooping Cough.	Typhoid Fever.	Smallpox.
		Pulmonary.	Other forms.							
1	WOOD COUNTY—Concluded.									
2	Ross .... *Tp.*	......	1	......	......	......	6	......	......	......
3	Troy * .... *Tp.*	......	......	......	......	1	......	......	......	......
4	Webster .... *Tp.*	......	......	......	......	1	......	......	......	1
5	WYANDOT COUNTY—									
6	Carey .... *Vil.*	......	......	5	......	......	......	......	......	......
7	Kirby .... *Vil.*	......	......	......	......	2	......	......	......	......
8	Marseilles .... *Vil.*	......	......	......	......	......	......	......	......	4
9	Sycamore * .... *Vil.*	......	......	2	......	......	......	......	......	......
10	Upper Sandusky .... *Vil.*	......	......	......	......	......	7	......	......	......
11	Wharton .... *Vil.*	......	......	......	......	......	......	......	1	1
12	Jackson .... *Tp.*	......	......	......	......	2	......	......	......	1
13	Marseilles .... *Tp.*	......	......	......	......	2	......	......	......	38
14	Mifflin .... *Tp.*	......	......	......	......	4	......	......	......	......

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PUBLICATIONS OF THE OHIO STATE BOARD OF HEALTH.

Annual Reports.

1886, 87, 88, 89*, 90, 91, 92, 93, 94*, 95*, 96, 97, 98*, 99*, 1900, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12.

*Sanitary Record (Monthly), 1868 to 1894. Vol. 1 to Vol. 7.

*Ohio Sanitary Bulletin (Quarterly), 1895 to 1896. Vol. 1 and 2.

*Ohio Sanitary Bulletin (Monthly), 1897 to 1908. Vol. 1 to Vol. 12.

Quarterly Bulletin, Ohio State Board of Health, 1909 and 1910. Vol. 1 and 2

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HEALTH IMPROVEMENTS NEEDED IN OHIO.*

H. T. Sutton, M. D.
President, Ohio State Board of Health.

This conference is provided for by state law in order that it may consider the cause and prevention of dangerous and communicable diseases and other measures to protect and improve the public health.

You, the local health officers of Ohio, are the men upon whom depends in a large measure the protection of the health of the state. We have a state department of health in charge of an able secretary and executive officer who has made a profound study of health administration, but in the end he must depend largely upon you for whatever success may be attained in state health work. You are really an important part of the machine which has for its work the prevention of disease in the state. As the health of each of your communities depends upon the health of all the individuals so the health of the state depends upon the health of the various cities and counties. You are the men upon whom falls the responsibility of preventing disease in your respective cities and counties. The state board cannot do your work. You are essentially a part of the state organization and must share in its successes or failures. You have responsibilities to your respective communities but your responsibility to the state is just as great, for disease is no respecter of city or county boundaries and the welfare of the state depends in a measure on health conditions in each of your cities and counties.

In order to prevent disease the first thing to be done is to find out where it is and under what conditions it is occurring. This can only be done by having the physicians report the cases that they are called to attend. The satisfactory control of disease without the cooperation of all the practicing physicians is impossible. Every practicing physician is therefore a working part of our health department. They constitute the skirmish line of the health department, so to speak giving information of the presence of the enemy, the appearance in the community of the diseases which it is the duty of the health department to control. The work of the health department has changed and grown much in the past twenty-five or thirty years, due to increased and more definite knowledge of the cause of diseases and the manner in which they are spread. Many states together with Ohio are now attempting to prevent what are known as industrial diseases, particularly the industrial poisonings such as lead poisoning. To do this it is necessary to have the cases reported, showing the conditions existing capable of producing the diseases, conditions that should be remedied.

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*Address before the Forty-first Conference of Ohio Boards of Health, Columbus, January 28-29, 1915.

In health administration morbidity reports are very essential,— serve many purposes to protect the community at large; make it possible for the sick to receive proper treatment, as in ophthalmia neonatorum, diphtheria, etc. In pulmonary tuberculosis such reports show the number of cases and the need for sanatoria. In malaria they show the prevalence of the disease and the need of drainage, etc. In typhoid fever they show a faulty water supply or milk supply. The state has made it possible for you to require all the information necessary as to the status of all diseases within your jurisdiction. The duty of securing reports is left in your hands so that you alone are to blame if cases are not reported.

The state of Ohio through the legislature and the State Board of Health has made it a misdemeanor for a physician to fail to report to you every recognized case of certain designated diseases among his patients, and has fixed a penalty for such failure. The penalty of course is only intended for those who would not otherwise obey the law and it is to be hoped there are few requiring its application. The physician who fails to report is neither true to his patients nor to the community; besides he is a criminal in the eyes of the law; he also violates the spirit of his ethical code and his citizenship. For the same reason that the physician should report cases to you, you should report to the state department of health. The state department should at all times have information of the prevalence of preventable diseases throughout the state: if you fail to give this information to the state department you are as culpable as the physician who fails to report his cases, in fact you are more to blame because you should realize more fully the importance of such a report. Such reports make it possible for the state department to notify you of the threatened epidemic so that you can take steps necessary to protect your communities: in other words it enables us to keep you informed — it is important for you to know of the prevalence of disease in neighboring localities as well as your own. The state department as well as yourselves, is interested in knowing the prevalence of preventable disease in the adjoining states, and for this purpose the health authorities of the different states in conference with the federal public health service adopted a plan whereby they will report regularly to the federal public health service and in this way we can keep posted in regard to the prevalence of preventable diseases in adjoining states. These reports are published in the public health reports and sent to all persons engaged in public health work who request it.

Health organization in Ohio is very inefficient and must of necessity remain so until we get some new legislation such as is proposed in the new district health bill which will be presented to the present General Assembly.

This bill will very materially reduce the number of health units and increase the size of them. It is a well established fact that the smaller the health unit the poorer the service and the larger the health unit the better the service. There are at present about 2,200 health divisions in the state of Ohio. If this bill becomes a law all departments of health in villages and townships will be replaced with whole time well trained health officials, the equal of the health officers of the larger cities. Under the district plan it is proposed to have the State Board of Health act in an executive capacity and the county commissioners in an advisory capaacity toward the district health officer. All physicians and all progressive citizens should use their influence to have this district bill passed before the present Legislature adjourns. This proposed district plan will in my opinion place public health work on a much higher plane of efficiency and it is in every sense of the word along lines of economy.

This proposed district plan was submitted recently to the Conference of State and Provincial Boards of Health of North America held in Washington. It was a part of a report of a committee appointed to draft a model district and county health law. The report of the committee was unanimously adopted. The difficulty encountered in pushing through this very much needed legislation is the fact that the community as a whole does not appreciate the true value of public health work. It has been well stated that public health is purchasable, and it should be kept in mind that community prosperity is impossible without community health.

A bill providing for the transfer of the bureau of vital statistics from the Department of State to the State Department of Health is to be presented to this session of the Legislature; it likewise should have the support of all physicians, health officers and progressive citizens. At present there are only four states in the union where the bureau of vital statistics is separate from the state department of health: viz., Michigan, Massachusetts, North Dakota and Ohio. Vital statistics should be made of current value. They are of great importance in the control of communicable diseases. The present bureau of Ohio costs the state about $30,000 a year and furnishes the state department of health with no current information. This bureau is engaged almost entirely in the compilation of annual reports. By combining this bureau with the state department of health, statistics gathered may be made of current value and the cost of operating the bureau reduced at least one-half. This combination is strongly urged by the chief of the United States Bureau of Vital Statistics, United States Census and other leading authorities.

The field of usefulness of the Ohio State Sanatorium at Mt. Vernon should be extended. This institution cost the state approximately $750,000.00 and has a capacity for only 145 persons. Inasmuch as there are at least 35,000 cases of the disease in Ohio today and between 6,500 and 7,000 people dying annually from this disease annually from this disease in Ohio, and the disease is known to be absolutely preventable, it would seem that the state should take drastic steps to bring about an effective control of it. The state department of health maintains a division which is conducting a general educational campaign in regard to this disease, and is attempting to stimulate and encourage the building of local district hospitals. There are at present four district, three county and two municipal hospitals in Ohio. The present law requires the payment of $5.00 and does not provide for the treatment of those unable to pay this fee. The payment of fees for treatment in the institution should be placed in the hands of the State Board of Charities the same as all other State institutions. The inability to pay should not prohibit the treatment of any case of tuberculosis in this institution as is now the case. The state department of health should establish a bureau for the admission and discharge to all tuberculous hospitals in the state. This bureau would investigate the homes of all prospective patients and also the homes to which discharged patients propose to go in order to insure absolute sanitary conditions so that the disease will not again occur. There is now no provision for following up cases or investigating cases before admission to the hospitals. The capacity of this state institution should be extended to at least two hundred and this could be easily done by the building of inexpensive shacks on the hospital grounds.

Another much needed improvement is the establishment of a diphtheric antitoxin bureau or division in the state department of health to make and furnish free diphtheria antitoxin to all state institutions and to all the indigents of the state. The present list prices of antitoxin of the commercial firms furnishing this product are exorbitant; over $100,000 are spent annually by the state institutions and the local departments of health for antitoxin. If the product could be produced at cost it is estimated that not over $10,000 would be spent in the state annually. The cost of taking up this work would be comparatively small to the state department of health. At the present time we have a fairly well equipped laboratory, and by co-operation with the state veterinary department of medicine of the Ohio State University the cost would be materially reduced, as this department has now ample stable space for the horses which are used in making the antitoxin. The department of health in Massachusetts and several other states are now making antitoxin for free distribution. I might mention the fact that the state is now providing and making hog cholera serum, and it would seem that the state should at least give equal consideration to the children who are so unfortunate as to contract diphtheria.

Still another splendid opportunity is offered for this state to practice economy and increase efficiency, by transferring the laboratory work of the food and dairy division of the state agricultural department to the laboratories division of the department of health. At the present time the analytical work on food and dairies is being done by commercial chemists at a cost of from $2.00 to $8.00 per sample. About $15,000 per year is being spent for this work. The state maintains a fully equipped laboratory in connection with the state department of health. The dairy and food work is plainly public health work. Accurate estimates show that the laboratory of the state department of health can do all this work and also the work of the Ohio Board of Administration at a cost not to exceed $1.50 per sample. The average cost now paid by the dairy and food department of the Agricultural Commission is $5.00 per sample. The economy to be effected by such an arrangement as above described is very evident. It is not desirable to transfer the police work of this division to the department of health but it is certainly desirable to transfer the laboratory work. The results of the analysis would be furnished by the laboratory of the state department of health to the dairy and food division of the agricultural department.

We are sadly in need of some new legislation looking to the better care of the health of the school children. Only five states in this country require physical examination of school children; in others it is optional. If the state has a right to say that parents must send their children to school the state should see to it that the children are not needlessly exposed to disease or any other condition dangerous to health. The problem of looking after the health of school children is indeed a large one. The mere prevention of communicable disease is not sufficient, but the pupils should have good air, proper lighting and seating facilities, good water supply and sanitary toilet arrangements, etc. Teachers should be required to know considerable about sanitation, they should be able to teach the children the fundamentals of hygiene which are of such great importance to the community: namely pure air, good food, proper exercise, cleanliness of person and surroundings, etc. There are approximately 20,000,000 pupils in the public schools of this country. A careful examination of the statistics shows the following facts in regard to these pupils: 15,000,000 are known to be physically defective in one way and another. These defects are approximately distributed as follows: 5,000,000 defective vision, 1,000,000 defective hearing, 5,000,000 malnutrition, 1,000,000 spinal curvature, flat foot ,etc., 1,000,000 tuberculosis, 400,000 organic heart disease, 1,000,000 enlarged tonsils, adenoids or glands. In addition to the above mentioned defects 10 to 12 millions have defective teeth. With the above mentioned facts in mind the necessity for the medical inspection of school children is established. It is the duty of every health officer to advocate the medical inspection of schools in order that these defective children may have the benefit of early medical attention before it is too late.

When the lawmakers come to fully realize that it is worth much more to be kept well, than it is to be cured, and that a well organized and well equipped health department with plenty of means and power, could put the most of us physicians out of business, then there will be something doing.

A more effective propaganda against tuberculosis is the greatest need of the hour. It is not likely that any great things will be accomplished in the control of tuberculosis until the states and national government do as they did in the fight against the foot and mouth disease among the cattle, "Take the bull by the horns" and throttle him at any cost.

In this connection it is interesting to note the seriousness with which the state and national government viewed the foot and mouth disease among its cattle when it became a plague of no small dimensions. Fourteen states were quarantined and many herds of cattle slaughtered. Three hundred government inspectors (the most learned scientists in the agriculture department) were rushed to the scene of the disaster to co-operate with state officials in quelling the outbreak. Every possible precaution and preventative measure was promptly resorted to, to eradicate the infection. The most rigid regulations with heavy fines for violations were imposed upon railways and shipping points. Nothing was left undone by the inspectors to check the spread of the baffling disease, even children of farmers whose cattle were infected were kept home from school, and the national government shared equally with the states in bearing the expense of condemnation, isolation and disinfection. Their actions were timely and wise and command the highest commendation. Congress made an emergency appropriation of several millions of dollars to stamp out the dread plague. But what is the national government doing to check the ravages of the great white plague in the human family, which takes annually about 200,000 lives in our own country. They apparently show no concern whatever about the horrors of this, the greatest of all plagues on earth, but a few dead cattle created great excitement in the Congress of the United States.

Tuberculosis as well as most other diseases of the world could be banished from the earth if our medical knowledge could be backed up with proper authority and the co-operation of the laity. Conservative estimates show that about 70% of deaths are due to contagion. The almost total obliteration of typhoid in the army is a good illustration of what can be accomplished along the lines of preventive medicine, only 3 cases in 1913. Not a single case occurred in the inoculated. Notwithstanding the great number of troops scattered along the Mexican border in large camps. This means that typhoid fever as a military disease is a thing of the past. The same results could be accomplished throughout the country with a sufficient number of properly trained leaders in the public health field. How long would it take to drive diphtheria to the wall if antitoxin was used in every instance known to be indicated by an up-to-date health official? It would mean the saving of about 1,000 lives each year in the state of Ohio alone. In the face of the last statement which is a fact, a former Ohio Legislature turned down a bill which provided that the state make their own antitoxin and furnish it free to the indigent people of the state. The same body voted readily to appropriate $94,000 for an institute to study hog cholera and make serum for the same. "I fail to see where the hog has any right to squeal."

"WHAT I LEARNED ABOUT TUBERCULOSIS."

AUSTIN M. PATTERSON, PH. D.

Formerly we used to hear this or that person had died of consumption. Nowadays we read almost every day in the local newspaper that a person somewhere in the county has died of tuberculosis, a more scientific name for the same disease. It is the great "white plague," still taking its regular toll in spite of the fact that the method of preventing and curing it is now well known.

If this account seems too personal, please remember that a personal testimonial often convinces as nothing else will. Already acquaintances are saying to me, "Well, I guess you never really had anything the matter with your lungs, did you?" They seem to share the common belief that "consumption" is incurable, therefore if a patient is apparently cured, he never had it. However, people are gradually coming to recognize that tuberculosis is curable.

My trouble started with a "cold on the chest," which became an acute attack of bronchitis. After two or three experiences of this kind, I began to have chronic bronchitis, which at first disappeared in the early summer, but later lasted the year around. I did not know then that most cases of chronic bronchitis are tubercular.

A year ago last summer I felt tired, draggy, and without ambition to do a thing, but attributed it merely to the need of a vacation. One night I awoke and found my night clothes so soaked with perspiration that I had to get up, rub dry, and change. I had heard of night sweats, wondered if this could be one, and thought for the first time of tuberculosis. I had one or two more. One day I weighed myself and was startled to discover that I weighed less than at any time since growing up. All this time my cough persisted, sometimes better, sometimes worse. I had, part of the time, pains in my chest and shoulders, which I thought was rheumatism but now know was pleurisy, which commonly attends tuberculosis. I was a constant danger to those around me without knowing it, for though I did not spit on the floor or the sidewalks I did frequently do so in the streets.

FAMILY DOCTOR FOUND IT.

I went to the doctor, and I place it to the credit of my family physician that he at once proceeded to examine for tuberculosis and did not rest till he found undoubted proof of it, even though some tests for it had been given negative results. As I look at it now the symptoms seem plain enough, but on talking with patients one discovers that the general practitioner frequently does not recognize the disease until it is pretty well advanced. I was advised to go to the Southwest and did so as soon as I could dispose of my business. By the time I reached El Paso my sputum was profuse and began to be stained a deep red with blood, although I never had hemorrhages.

I consulted a specialist and was advised to enter a sanatorium, which is an institution for the treatment of tuberculosis in all its stages. I had hoped to escape this, for I dreaded being associated with sick people, and undergoing what I supposed would be a most rigorous and tiresome routine of keeping quiet. I knew this specialist had a sanatorium of his own, so I told him I did not care to travel farther. In two or three days a room became vacant, and I entered as a patient. I soon found that my dread of the place was entirely unfounded.

GOOD-BYE TO THE COUGH.

In short time the blood had disappeared, the cough was practically gone in ten days, and in the first six weeks I gained 22 pounds. At the end of five months I was able to return home to spend the summer, weighing more than I ever had before in my life and feeling greatly restored. I kept quiet all summer and on returning to El Paso in October the doctor found my lungs entirely healed and hardened. Even still I must take good care of myself and get back to my usual life gradually, to avoid a return of the disease. Mine is known as "an arrested case." After a year or so, if I have no further symptoms, the specialists would call me "apparently cured," so cautious are they in calling anyone absolutely cured.

It should be said that mine was not a bad case, that I had good resistance, and progress toward recovery was more rapid than the average. Still it was more than an "incipient" case. Three stages of the disease are recognized, incipient, moderately advanced, and advanced. My case was in the second, but advanced cases are also cured. I doubt if many incipient cases ever enter a sanatorium, for in that early stage the patient usually does not go to a doctor at all. If he did and the doctor detected it, a great deal of time, trouble and expense would be saved. Every case is an incipient case at one time.

HOW TO CURE CONSUMPTION.

Now for the way in which tuberculosis is conquered. Many persons no doubt would attribute such recovery as mine to the climate but they would be only very partly right. I would estimate the ideal conditions for a cure about as follows: Fresh air, nutritious diet and rest, each 25 per cent; climate, 15 to 20 per cent; other factors, such as tuberculin treatment, 5 to 10 per cent. So you will hear of a great many who recover in a moist climate by proper attention to diet, sleeping outdoors, etc., and also some people who move to a dry climate and work at making a living while at the same time conquering the disease. Some who cannot get ideal conditions recover anyway, but the safest way is to make your condition add up to as nearly 100 as possible. Just at present it is often said that one can take the cure just as well at home (wherever that is) as anywhere else. But the statistics of the sanatoriums do not bear this out. Those in the dry and especially the mild, dry climates, show the highest percentage of cures. Yet it is folly for a consumptive to leave home for a better climate if he is going to have poorer diet or less rest or fresh air than at home. Many do it, losing the greater advantage to gain the less.

"Fresh air" means sleeping outdoors and staying outdoors most of the day. Fresh air is good for everybody and sleeping outdoors is becoming so common that I need say no more except that it can be made comfortable even in winter. The same is true of staying outdoors in the daytime. In El Paso there are few days in winer when one cannot sit in the sun and be warm without being bundled up like an Eskimo.

"Nutritious diet" means for most a good, general, wholesome diet, beefsteak, eggs and milk being prominent on the bill of fare. It really does not make much difference what a consumptive eats provided it be digestible and form a nourishing and well balanced diet, and it certainly is a mistake to try to stuff. The golden mean is to eat so as to build up the system without overdoing the stomach.

"Rest" means just what the word says, though some people seem to think it means recreation or almost any change of employment. They have the notions of fresh air and exercise tightly associated (I admit that I did) and think that they must walk, ride horseback or "rough it" in some form. Rest is a prominent part of the treatment, and it varies from absolute rest in bed for patients that have much fever or have had hemorrhages to just ordinary "loafing" or short walks for those who are nearly well. Every patient at the sanatorium is supposed to observe the "rest hour" after dinner, when he lies down and sleeps if possible, and to go to bed at 9 p. m., but for the rest of the day the average patient is more at liberty to enjoy life than one might imagine. I was pleasantly surprised when I found what a good time we could have in a quiet way and how many of the patients looked as well, or better, than I did. The place did not "get on my nerves" as I feared it would.

MEDICINES DO LITTLE GOOD.

I spoke of tuberculin treatment. It is a question how much good it does but some physicians think highly of it, and given according to modern methods it can do no harm, so it is often administered. There is a new method of treatment by inhaling sulfur fumes which may be valuable but is still unproved. Such treatments as these cannot be considered a main part of the cure. Cod liver oil, if it helps the patient any, does so as a food rather than as a medicine. As for proprietary remedies such as Eckman's Alterative, Peruna and the rest, it ought it be made a criminal offense to advertise them for sale for the treatment of tuberculosis. They cost money, they do no permanent good, they make the patient lose valuable time, and in many cases they do him positive harm. If anyone is unconvinced as to this I shall be glad to direct him to some startling exposures of these frauds.

It is comforting, then, for one who has to save his dollars to know that he is better off without these medicines. But rest and a full diet are themselves expensive to a man who has a family to support; how is he going to find a way of living without working? My answer to that is this: If you persist awhile longer in working when you ought to be curing yourself, a time will come when you will quit work for good, be a charge to your family or the community for some months perhaps, and after that be no longer either a burden or a support to anyone. It pays to quit work in time, and that will almost surely be before you are absolutely forced to.

HOSPITAL IS ALL RIGHT.

However, the State of Ohio recognizes that the cure of tuberculosis is an economic question, that is to say, that it is expensive to the individual to get well, but still more expensive to the public to have him sick. It has therefore provided for county and joint-county hospitals where the public bears part of his expense in recovering. These hospitals are really sanatoriums like the one to which I went. I was sorry not to be able to visit the one which is at Springfield, in which our county is interested, but Dr. Grube tells me it is well appointed and managed. It is surprising to me that it is not full the year round. Certainly anyone in our county who has discovered that he has tuberculosis should be glad that he has such a place to go to; I am sure that knowing what I do now, I would not hesitate to do so unless I wished to gain the additional advantage of a more favorable climate, and felt willing to spend several hundred dollars to gain this. Such hospitals as the one at Springfield should not be considered charity institutions any more than the public schools, for in fact they are schools where the patient is taught to cure himself and avoid giving the disease to his family and others. Even if he goes for a few weeks only he can learn what to do for himself at home. The trouble is, so I am informed, that so many of those who seek admission to the joint-county hospital have waited until entirely too late; they are in a far advanced state and go there either to die, or else to drag out a few weeks and then go home to die. Such occurrences would naturally give the impression that the hospital is merely a place to send a person who would otherwise be a burden to his family. The hospital is open to far advanced cases but it fails in its chief purpose if patients in the earlier stages do not go there to be cured.

"CAN I GET A JOB THERE?"

I have been asked about opportunities for "lungers" in this Southwest country and must say in reply, as every Chamber of Commerce out here is saying, "Don't come unless you have enough money to keep you for several months." It costs $25 a week in the sanatorium where I was a patient for all expenses except laundry, and this is about as low as is obtainable anywhere in a private sanatorium. Living out in town costs less, but board and lodging are not cheap for those who have the disease, and medical attention, which everyone should have at least till he learns how to treat himself, costs from $10 to $30 a month. This is a place of splendid opportunities for a healthy person, and lungers are not discriminated against after they get well, but those who are sick will find it very hard to get employment. There is special competition for light, open-air jobs such as interfere least with a consumptive's recovery.

THESE "LUNGERS" WERE CURED.

For the benefit of those who are discouraged I might add that the specialist who cared for me had a bad case himself and suffered forty hemorrhages. He is now the picture of health and does a large amount of hard work. The business manager of the sanatorium is a cure, so is his wife. Indeed it is said that the big majority of El Paso's inhabitants either had the disease at one time or else are members of families in which it was found. Yet they are a live, healthy-looking lot and my dreams of seeing pitiable, hollow-cheeked people on every corner were never realized.

One thing more: Can a person who has been cured in an arid climate go back to the East to live? This is a disputed question and one in which I am somewhat interested myself. Many cases can be cited of people who have done so and remained perfectly well and others have suffered a rapid decline in the East. My own conclusion is that some get well here who would have not done so in the East. Bad cases who recover here would be wise not to make the attempt to live again in a moist climate but should be thankful they are alive at all, and they will find the West isn't the worst place on earth by any means. Those who have had lighter cases should first make sure of a thorough cure and can then try living at home cautiously. After living in a mild climate one naturally has to get hardened to severe cold again.

If our local physicians will be on the alert to detect tuberculosis in its incipiency and if possible victims will co-operate by suspecting every long-continued cold on the lungs, cough or bronchitis, whether they have had any other symptoms or not, the right way to a cure can be taken and a surprising number of lives can be saved yearly in our own county.

El Paso, Texas, December, 1914.

THE HILLTOP TRAGEDY.*

VICTOR C. VAUGHAN, M. D.,
President, Michigan State Board of Health.

At the outbreak of the Civil war Dr. Edward Smith was easily the leading surgeon in the metropolis of one of the northwestern states. At the first call for troops he offered his services and was made surgeon of the first regiment from his state. Leaving his wife and infant son, he served in the Army of the Potomac, sparing himself at no time and winning high distinction for his skill, devotion, and energy. A few days before the surrender at Appomattox, in following the firing line too closely in his solicitude for the wounded, he was killed. At the close of the war his widow found herself and her little boy in comparative poverty. Her husband's three most intimate friends had served their country, the first by supplying the commissary department, the second by furnishing uniforms, and the third by handling medical supplies. All had been paid for their second rate material extravagant prices by the government, and were immensely wealthy at the close of the war. They had made money out of the dire necessities of the nation while the doctor had ministered to the suffering of his fellows, both those who wore the blue and those who wore the gray. He gave his time, his skill, and his life in the cause of humanity.

When social affairs began to adjust themselves after the struggle of four long years, the widow lived in a small cottage on a side street, while her husband's former friends were building palatial residences on the boulevards. She took the small amount to her credit in the bank and bought a truck farm near Hilltop, a village some miles from the city. Her superior ability and thrift enabled her to make a comfortable living and to educate her boy. He went to the University, taking a course in science and literature, and following this in medicine. He was a conscientious, thorough student in all his work and when he had his medical diploma, finding that his mother would not consent to change her place of residence, where she had found solace and comfort, he located in the village of Hilltop. If he ever had a love affair no one knew it. He devoted his whole being to his mother, now showing the weight of advancing years, and to his profession. This accounts for the location of Dr. Smith at Hilltop. He spares no pains, time or money in keeping himself familiar with every advance in his profession. He reads French and German and visits the hospitals and clinics of this country and Europe from time to time. Hilltop is a village of some fifteen hundred inhabitants, and is surrounded by fertile lands on which the majority of the farmers make a good living, while the thriftless, both in village and country, exist without apparent effort. From the well-to-do the doctor demands and receives, for the most part ungrudgingly, fair fees; while the ne'er-do-wells demand his services most authoritatively when ill, and pay in deprecatory remarks after recovery. The community is typically American. Most of the inhabitants were born where they now live and their ancestors came from New England by way of New York. Several generations of American birth lie behind them and their virtues and vices may be regarded as strictly indigenous and uninfluenced by admixture with foreign blood. It is true that some of the family names indicate that highly diluted Pennsylvania Dutch blood may still flow in the veins of their possessors. Moreover, the village saloons are kept by Irish descendants and German immigrants, and there are scattered representatives of those nationalities in other callings. It goes without saying that, in the village, the traffic in textiles, from old rags to the latest Parisian fashions, is conducted for the most part by descendants of Abraham. It is now more than thirty years since Dr. Smith hung out his shingle in Hilltop. His professional ministrations have extended to nearly every home in the community and there is no one more competent than he to correctly estimate the character of each inhabitant. However, if he ever applies standards of moral or intellectual measurement to his clients and neighbors, he keeps the results to himself. To praise, even the most deserving, means offense to those who are superior in their own estimation, and he is slow to blame except in professional secrecy when he does not hesitate, after careful diagnosis, to administer heroic doses of indignation. No one appreciates more clearly than he how largely our vices are due to inherited tendencies and environmental temptations.

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There is the life history of Linden Lewis, which has given Hilltop a prominent place on the first page of the great metropolitan newspapers. Most of what was printed in the papers is true, but only half the truth was told. When Linden was tried for murder in the little courthouse on the village square, brainy lawyers did their best to suppress the truth in which they were aided by the learned judge on the bench backed by the rules of criminal procedure. The truth was hidden beneath the technical verbiage of insanity experts, selected not for their eminence in the profession, but for their willingness to pervert science for pay. The tiny speck of truth that remained when "the taking of evidence" closed, was washed away by the streams of eloquence whose flood gates were then opened. A jury of twelve men, who had been selected for their ignorance, tried honestly to see the truth, but soon lost sight of it and decided the case while still under the domination of the most convincing orator in the great array of legal talent engaged in the case. The result was that Linden went to the gallows, a victim of heredity and environment. This was probably the best thing that could be done for Linden, but the conditions which made him a criminal are untouched and continue to breed his kind. Dr. Smith could tell the true story of Linden's life and his crime, and it would run as follows:

THE BLIGHT OF PRE-NATAL INFLUENCES.

Linden's father in his youth had sown his wild oats, which means that he became alcoholic and syphilitic. He bore alcohol without developing the symptoms of drunkenness and he had continued a constant drinker. Partially cured of syphilis, or more correctly temporarily relieved of the symptoms by proper treatment in which he declined to persist, he married a beautiful but silly girl. The first child, Linden, begotten during the improved state of his father's health, was apparently healthy and grew into an unusually attractive youth. The suppressed syphilis reasserting itself on the discontinuance of proper treatment, the wife presented her husband with only dead children. Having been born feeble-minded, she had no intellectual growth after her marriage, and the disease acquired from her husband engrafted on her inherited defect makes her a miserable invalid. As her beauty faded and her lack of intellect became apparent, her husband began to feel a sense of repulsion at her presence and in later years he unjustly regarded her as the source of all his trouble. He has been the leading banker and capitalist at Hilltop for many years. He loans money on the highest terms the necessities of the borrower will permit and demands sound security in every case and closes the transaction with every advantage to himself, the laws, enacted for the most part in the interest of his class, permit. He is a potent factor in the dominant political party of his county and state and the young men in the legislature find it well for them to follow his advice, because those who have not, it has been observed, serve only one term. Dr. Smith many years ago correctly diagnosed his case and urged proper treatment, but his patiently stoutly asserted that he was all right and drank deeper from the decanter each night, while he braced his appetite before each meal with a liberal portion of an alcoholic nostrum. For some years past the keen eyes of Dr. Smith plainly saw the slowly developing evidence of general paresis in the man who spurned his advice.

Such was the parentage and such the home of Linden Lewis. Surely both inheritance and environment were shaping his destiny. Notwithstanding all these untoward conditions, the boy developed into a most attractive youth. In school he stood high, learning without apparent effort. On the play ground he was easily the leader in all athletic games. In all his associations he displayed a dominant personality. Dr. Smith watched the evolution of this product of nature's laboratory with scientific interest and with the deepest personal sympathy. He cultivated the boy's acquaintance and tried to direct his energies. The boy returned these advances with a growing admiration for the man. The two became fast friends. Without consciousness of being directed, the boy acquired a sound and substantial knowledge of the elements of botany and zoology. The doctor had a large garden filled with carefully selected plants and conducted numerous experiments in breeding and crossing selected varieties. In this work the boy became a most enthusiastic and intelligent assistant. He learned about the Austrian monk, Mendel, who was the first to study inheritance in an experimental way, and he became acquainted with the Mendelian laws, which were amply verified in the plants before him. With the physician's microscope he became familiar with amebae, diatoms, and other low forms of life. When the doctor noticed the boy's awakening intellect, caught the unconscious play of interest in his facial expressions, and answered his thoughtful questions, he said to himself: "Surely environment is the most potent factor in shaping the individual. It *is* possible to neutralize the ill effects of bad inheritance. So far as I can I will nourish this human plant found in a bed of weeds, and lead it to develop into a thing of beauty and worth."

By this time, the boy's home environment, which had always been evil, but in a negative rather than in a positive way, was replaced largely by that of the doctor's office and garden. In his nineteenth year, Linden graduated among the first in his class in the high school. The question of college had been a subject of frequent discussion between the doctor and the boy with final reference, of course, to the father. It went without saying that the boy must go to the University. The doctor realized the importance of the proposed change in environment and made every possible effort to secure for the boy the most desirable associations during his college course. He kept the boy busy in his scientific studies during the summer and when the time came for college to open, he went with Linden to the University city, and aided him in the selection of a room and boarding place and introduced him to some of the professors. To one of them, an old classmate, now the distinguished head of the biological department, he confided the story of Linden's parentage and home and asked this professor to watch over the conduct of the boy. The selection of a chum the doctor regarded as of the highest importance. Fortunately, another boy from the vicinity of Hilltop was entering the same class. This young man, Robert Blake by name, was the son of intelligent parents, farmers, who owned and cultivated with profit a tract of fair dimensions in the river valley a few miles from Hilltop. The doctor knew Robert as well as he did Linden; in fact, he had officiated at the birth of Robert, his two brothers and two sisters, for all of whom he felt a paternal affection. Robert came of good stock and his home surroundings were ideal. Robert and Linden had been classmates in the high school and each was pleased when the doctor proposed that they should room together at college. The living quarters selected for them by the doctor were somewhat more expensive, as the doctor knew, than Mr. Blake would feel that he could afford for Robert, but the doctor paid the landlady the excess out of his own pocket and neither Robert nor his father ever knew the real cause of the landlady's most gracious concession to the request that the price of the rooms be lowered.

During the first month of his college residence, Linden was surprised when he became conscious of the fact that he was the storm center of fraternity rushes. The fame of his father's wealth and political prominence had preceded him. Old "grads" had written, each to his own fraternity, that Linden was a prize which must be secured. At first he and Robert were invited to dinners at the fraternity houses, but the second invitation from the same quarter never came to Robert. Evidently the result of the first inspection was that Robert, the hard-working, plainly clad, modestly spoken son of an unknown farmer was not likely to become a star in the social firmament, whatever he might do in class room or laboratory. Invitations still crowded Linden's hours. Lunches, dinners, midnight suppers, drives, *et cetera,* filled the days and nights to the exclusion of scholarly duties. He heard much about the great "Greeks" and occasionally he found a minor member of the faculty aiding in impressing him with the belief that the highest honor to be won during college life was the right to wear the emblem of a special fraternity. Several times Linden was almost persuaded to take the pledge, but when he learned that renunciation of Robert and the disapproval of the doctor were the price that he must pay, he concluded that the badge of distinction was too costly. Having declined these generous and highly distinctive honors, Linden was voted by the would-be donors "a freak" and a "molly-coddle." Lacking in proficiency in college slang, we will not attempt to define these terms. Later, Linden learned that there are fraternities that demand good scholarship of their novitiates and in their second year both he and Robert became members of one of these mutually helpful organizations. Both boys passed the work of the first two years creditably and the vacation preceding their junior year was spent under the guidance of the Doctor most delightfully and profitably in a tour through Europe.

As he bade the boys good-bye on their return to college, that fall, the Doctor felt so good that he put his finger on his pulse and as he felt the full throb he said to himself, "Really, when I get back to the office, I must take my blood pressure. Can it be that I overtaxed my heart in trying to keep up with those young rascals when they insisted on ascending a path up the Schilthorn taken by the guides only in descent." But, when he did reach his office, he found in the newly arrived mail a fresh article by Galton on "Eugenics." He read it with devouring haste, and, as he finished, he exclaimed, "The great Englishman is wrong. Good environment can overcome bad heredity. I have demonstrated this, not in my garden, it is true, where everything confirms Mendel and Galton, but with my human plant, it is coming out all right. The laws that control the lower animals may be modified in the more plastic structure of man."

However, in the midst of his most sanguine expectations, there was an ugly suspicion which at times suggested itself to Dr. Smith, like the whispering of an evil genius. Mary Blake, Robert's elder sister, about three years younger than Robert and Linden, was nearer the Doctor's heart than any other of the many girls and boys he had brought into the world and led safely through the accidents and diseases of childhood. Being childless himself, Dr. Smith had found his natural paternal affection satisfied in his professional solicitude for these children, and his greatest pride, he was ready to admit to himself, was in Mary. Normal in body and mind, without inherited defect, or acquired stain, the Doctor looked upon her as the most perfect and promising plant in his human garden. Linden, Robert and Mary had been children together, had passed through the savage and barbaric states in their play and the Doctor had thought that now Linden had reached the age of chivalry, his eyes would be turned in some other direction, but the Doctor had seen during his trip abroad with the boys that while Mary wrote both boys, her letters to Linden were longer and written with more care than those to her brother. Still more alarming was the different reception met with by Mary's letters. Robert read his but once and carelessly, while Linden read his repeatedly and lost interest for the time in all else. Robert's answers were short and hastily scrawled, while Linden spent many hours in the writing room when the long tramp should have sent him early to bed. When they stepped from the train on their return, the Blake family was on the platform, and Mary had sisterly greeting for the brother and maidenly welcome for Linden. Inexperienced as he was in love affairs, Dr. Smith had not failed to see these things, and their memory came to cloud his brow, after he had read Galton's article. "No," he said to himself, "I am sure that Galton's wrong, but Mary must not be involved in this case." But the evil sprite, having found a tender spot, began to unroll scrolls of memory pictures, each of which was more convincing and annoying than its predecessor. Then, he recalled that Blake family had been with him to see the boys off for college, and that they were probably still in the village. He jumped into his runabout, hastened down the street, and, as luck would have it, he found the family ready to start for home. Telling a white lie, that he had just received a telephone call out beyond the Blake farm, he offered Mary a seat. Always glad to ride with the Doctor, she accepted and soon they were rapidly rolling along the river road. He had decided to plunge at once into the trouble on his mind, but now he had the opportunity, he could not do it. Mary talked about everything in sight, and before the Doctor realized it she stepped from the car at her father's gate, and was dismissing him with the hope that he would not find his patient so seriously ill as he feared. The Doctor had thought himself a strong man, ready to speak out the truth, when necessary, but this artless girl had paralyzed his organs of speech, and the evil sprite continued throughout the drive, and the night that followed to unroll memory pictures. Through the next morning, he was busy with those who needed his deepest attentions and best effort, but the afternoon found him driving up the elm avenue of the Blake home, rehearsing what he was to say, while Mary waved him a welcome from the window and then disappeared. Shortly the two were seated on the vineclad porch by the side of a dainty table with ice cold milk, fresh butter, delicious bread and buckwheat honey, for Mary knew that the Doctor was always hungry when he came to the Blake home. She was returning to her college in a few days, and she had so many things to consult him about. What studies should she take, what outside reading should she do? The hour passed and the Doctor was returning home, his often rehearsed speech unspoken and saying to himself "If her flesh were torn I could mend it with a steady hand, but if her heart is ever torn God may heal it, I cannot." Mary returned to her college and the Doctor's warning was never given.

THE WORM IN THE BUD.

The work of the boys at the University went along as usual, but the professor of biology wrote Dr. Smith a long letter, in which he said that during the first year Linden had seemed the brighter of the two boys. He was the quicker in comprehension. During the second year, Robert gained and forged ahead, and now at the beginning of the third year, Linden manifested well marked mental fatigue. He had no reason to criticise his conduct, and he seemed to be making greater effort than previously, but progress was not so evident. The Doctor again went over Galton's arguments, and marshalled the claims of Euthenics against those of Eugenics, environment against inheritance, nurture against nature. Rigidly honest in this survey, he had to admit that so far as plants and lower animals are concerned the evidence did not portend the success of his efforts, but the hope of an exceptional issue in the special case, of divine intervention, of a personal providence, of a miracle, still finds lodgment in the mind of the most scientific man.

On Thanksgiving Day, the University meets its old rival in the Big Seven on the football field. The importance of this event is second to none in the college world. For three consecutive years their University had been defeated by this great rival, and this long humiliation was to be borne no longer. It is true that in oratorical contests and debating matches their University had won the honors, but who cared for these trifles, which, if mentioned at all in the newspapers, were found only after special search, in some obscure corner and in small type, but tomorrow the result of today's contest would appear in bold type on the front page of every paper from Boston to San Francisco. The photographs of the contending teams, with special cuts of the captains, quarter-backs and other heroes, would occupy a large space. Every detail would be described in words, phrases and sentences which only the educated sportsman can understand, and more than this the Western Union had laid its wires to the field, and while thousands would witness the game, tens of thousands in cities and villages would watch the bulletin boards and groan or applaud as the advantage seemed to be on this side or that. The banker would stop counting his gold, the lawyer pause in the preparation of his brief, the physician forget his patient; all for a moment, to hear the score of the great game. In the great hall of the rival university, the students who were unfortunate enough not to be able to attend the game in person would assemble and with a large diagram of the field before them would follow every move.

In this great struggle during which the whole world would hold its breath, their university must win. The blot on their escutcheon must be wiped out, and the banner of the rival must be trailed in the dust. All the fall each of the rivals had been preparing for the great contest; indeed preliminary practice began some weeks before college opened. What an honor to be chosen by the Coach for a position on the 'Varsity team! Selection even as a "scrub" secures at least temporary fame to the fortunate individual. Let ordinary students be content to "bone" and "grind" in class room or laboratory, only those chosen by the gods constitute the university team. The University shows its paramount interest in and appreciation of this branch of education, by paying the Coach more salary for three months' time than it pays its most renowned professor annually, and by spending tens of thousands of dollars on the field and its appurtenances, while the students are hourly benumbed in unventilated lecture rooms, limited in their laboratory studies by inadequate equipment, and handicapped in the pursuit of knowledge by the insufficiency of the library appropriation.

The night before the great contest, there is a splendid mass meeting to arouse college spirit and to pay homage to the heroes of tomorrow. The Coach and his demi-gods sit at a raised table, above a multitude, and stories of the fleetness of limb, strength of muscle and skill in play held in reserve for the morrow go around the throng in whispers. Old grads, some now growing gray in most honorable service, have traveled half across the continent to participate in this great function. Dr. Smith, with his friend, the Professor of Biology, and his boys from Hilltop occupy inconspicuous seats in the rear and discuss the influence of stimuli on animal behavior, concluding that the surplus energy of youth in the mass must have proper vent. The fiery oratory of the speakers and the thrill of the college songs sung by the glee club and participated in by the immense throng do justice even to so mighty an occasion. Practice in the yells and songs of cheer and stimulation for their side and of depreciation of the opponents close the formal festivities and the Coach with his chosen warriors depart early, for they must be fresh and strong in muscle and alert in nerve activity on the morrow. The masses disperse in groups and listen with eager attention to those who have inside information concerning the new and wonderful plays, devised by the Napoleonic genius of the great Sphinx—the Coach—by which the adversaries are to be humiliated. If the gods granted their chosen eleven a special dispensation in a refreshing sleep, it is not a matter of mortal record, but each man in the reserve saw in his dreams that night wonderful opportunities for the display of his special superiority which even the penetrating eye of the Coach had not detected.

The great day broke clear and crisp, dissipating the gossamer fabrics woven by the dream fairies together with the thin mantle of hoar frost with which the night had draped the university town. Every house was decorated and the university colors were seen everywhere. They unfolded in great flags and fluttered in tiny pennants pinned on the person of every inhabitant. Special trains, all bedecked, began to roll in and pour enthusiastic crowds into the streets where they paraded with brass bands, bagpipes, cowbells, tin horns, and every known instrument of discordant sound, creating an aerial tumult which would have made the ear drums of a deaf Beethoven writhe in agony.

Before noon the rival team, which had been engaged in secret practice nearby for some days, came into town. The university band met them at the station, and escorted them to their quarters on the field. The rivals were accompanied by hundreds of fellow students, who paraded the streets displaying their colors, shouting their yells, boasting of their former victories and promising to add another star to their crown of glory. Thanksgiving dinners must be postponed until after the great event, because cooks and waiters as well as boarders must be on the bleachers before the game is called.

Long before the hour, the 30,000 seats were filled with boys and girls, men and women, old and young, rich and poor, all tossing jibes and jests in the best of humor. The Governor of the State, men eminent in the affairs of state, national and local, divines, lawyers, physicians, and, in short, men from all callings and conditions of life were boys again for the time.

The reader is referred to the historians of college sports for an account of the game. These versatile and gifted writers, unlimited in vocabulary, strong in metaphor, happy in phrasing, skilled in detail and brilliant in generalization, told just how it was done. Suffice it to say that when in the midst of the deepest suspense, time was called; the final score stood six to five in favor of the local team.

No writer has ever adequately described the pandemonium that reigns in a college town throughout the night after a great football victory and the present humble chronicler shall not attempt it. Dr. Smith after cautioning his boys, took a train for his home, his own pulse beating extra time, his face beaming satisfaction, and his mind unoccupied by any eugenic subject. The college authorities had wisely provided for a great bonfire and as its flames lit up the sky and cast great shadows over the earth about, speeches, songs, and wild yells proclaimed the great victory. Learned men have studied and attempted to explain the psychology of crowds. Under the irresistible strain of emotion in masses, weaker characters drop the veneer of civilization and stand forth in naked savagery. It is the same force that becomes dominant in a mob incited by a dastardly murder, and in a crowd of college boys elated by a football victory.

AND THEN ONLY BLASTED FRUIT.

Linden was alone and finding his way back to the lighted streets when a number of drunken students, his old friends, the "Greeks," set upon him, were stripping him of his clothing, attempting to bind him while one of their number was urging him to drink from a bottle of whiskey. Linden struck out right and left and soon his foes, all save the one with the bottle, were sprawling on the ground. Linden seized the bottle, drank deep of its contents, and with a cry like that of a wild animal, fled in the darkness.

Where Linden spent the next two days his friends could never ascertain, and he could give no information. On the third night, he was found in a demented state, half clothed, without watch, money and ring, wandering in one of the poorly lighted streets on the outskirts of the city. The officer who took him in charge, wiser than most of his kind, carried him to the psychopathic hospital instead of the jail. Here he was immediately recognized and Dr. Smith and Robert were notified. The diagnosis registered at the hospital and which played so important a role in the war of experts at the trial was "mania potu" (dipsomania), and "epilepsy."

During these years through which we have followed Linden's career, his father's material wealth and political power had grown phenomenally. It was the age of unrestricted trust and combination in varied lines of business and the village banker had become a great captain of finance. He was reported to be a multi-millionaire and might have been governor or gone to the senate chamber at Washington had he so desired, but he preferred to fill such positions with those who would do his bidding, and he was believed to do so. In fact, more than one man was said to owe his high judicial appointment to Lewis and certain decisions gave ready and reasonable credence to these rumors. Apparently he was not only in health, but possessed of unusual strength of both body and mind. He formed trusts in food supplies, building material, transportation facilities, and other lines involving the necessities of life. He bought out the most prosperous firms or induced them to go into the combine, crushed weaker competition, advanced prices, declared big dividends, sold stock at fabulous prices, and, in short, anything he touched yielded a big financial return. He continued a steady drinker, but never entered a bar room and was never intoxicated. He was not given to conviviality and was too busy in his great schemes to have intimate friends. When the matter in hand had been decided, and this was always done without circumlocution, he dismissed his visitor or took his departure. He seemed to have but one aim in life and that was to do big things in a financial way. To be permitted to have business transactions with him was regarded a fortunate privilege. As Kraeplin says, "the paranoiac often has a longing for big and lofty achievements, a secret yearning for bold activity, a firm conviction of being born for something special." The elder Lewis was possessed by "a fixed idea" and when called to see Linden at the psychopathic hospital, his visit was short and the whole matter was treated as of but little importance. The physician was told to spare no money and to send the boy home with a nurse as soon as he could safely travel the short distance, and with this the father seemed to forget the son. Dr. Smith and the attending physician suggested that Linden should remain in the hospital or should be sent to some proper institution for prolonged detention, observation, and treatment, but the father dismissed this proposal with a most emphatic and final negative. His authority in the matter was supreme. The young man had as yet committed no crime and in a few days he left unaccompanied and undirected. We make no effort to even guard the potential criminal and there are thousands in our midst today. The result is that the number of murders in this country, according to Judge Weir, is ten thousand per year, an average of more than one for every hour, and of other crimes, who can number them? Our police courts are busy with criminals every minute. Our penal institutions are not big enough to accommodate them. Our cities are infested with them, and no rural community is long free from them.

Linden disappeared from the ken of his friends. From time to time rumors came to Hilltop that he was living a gay and riotous life in the great city, abundantly supplied with money and credit by his father's checks and financial reputation. Knowing that Dr. Smith had advised his detention in the hospital, with the proverbial tendency of the mentally ill to turn against their best friends, he repulsed every attempt made by Dr. Smith to get in touch with him.

One morning in the following June as the Doctor walked in his garden, the postman came with his mail. He seized with apprehension upon one letter which bore Mary's well-known handwriting and the postmark of her college town, and, letting the others fall on the gravel, he tore it open and read with feverish haste. It ran as follows:

"Dear Doctor: I am going to save Linden. He says that if I will marry him, he will purchase a farm in New England and never leave it. We are to be married tomorrow morning and go immediately to select our home. Please see my family. I cannot write them. I know that they will disapprove, but I love Linden and my first duty is to him. Lovingly, Mary."

Linden procured the license without question and the minister who performed the ceremony felt highly honored in being called to officiate at the marriage of the son of the great financier, and he had no aversion to the crisp bill bearing three figures, even with two of them ciphers. The farm in New England was never found. For a few short weeks Mary was happy in the delusion that she had done the right thing, then lapse followed lapse with short intervals of golden promises and lofty resolutions. The fearful realization broke upon her after being led from one humiliation to another, and before the snow of the next winter had disappeared from the meadows in the river valley, she had fled to the protection of his father's home, a broken, crushed woman, a deserted, disgraced wife, conscious of the fact that her fatal mistake involved not only herself but her unborn child. It came into the world a poor withered thing, bearing the sins of past generations. A few days after the birth Mary was awakened from the first refreshing sleep she had known for many months, a sleep in which the fairies of dreamland had rolled back the years and drawn aside the black curtains of the past and with Linden and Robert she was gathering the first hepaticas that grew on the hillside in the woodland pasture. Over her brow, almost touching it, was the face of Linden, hideous from dissipation. He tore the poor babe from her arms, dashed it against the wall and shot the mother through the heart. Turning from his fearful deed, he saw Robert in the doorway and shot him through the temple, then he fell in an epileptic fit on the floor.

As has been indicated, Linden went to the gallows for his crime and his father is now diligently but harmlessly devising great financial schemes in a madhouse.

* * *

This is a horrible story. The writer has penned it with the greatest reluctance and with sorrow. Is it true? Read the daily papers and find the answer. What can be done to prevent the repetition of such a tragedy? This is a question for which all thoughtful and intelligent people should strive to find the correct and effective solution. The writer would have found pleasure, instead of pain, in recording examples of the innate goodness and greatness that flow spontaneously from the masses of mankind when the combat is with disease and death, but before our national ills can be treated and cured, we must see them as they exist.

A SURVEY OF INDUSTRIAL HEALTH-HAZARDS AND OCCUPATIONAL DISEASES IN OHIO.

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PART II.

(*Continued.*)

THE GENERAL PRINCIPLES OF INDUSTRIAL HYGIENE.

INDUSTRIAL VITAL STATISTICS.

In order to avoid needless repetitions in the description of Industries and Processes investigated in the State during the course of the Survey, there will be discussed at this place and in Part III, those factors which are looked upon as the principles, or essential features, of industrial hygiene, avoiding, as far as possible, all niceties and refinements, and endeavoring to adhere strictly to the features which are primarily detrimental to health.

For those who wish to go into this subject more fully, we recommend the following authoritative works and references:

"Diseases of Occupation and Vocational Hygiene", edited by George M. Kober, M. D., Professor of Hygiene, Georgetown University, President, Section on Hygiene of Occupations, 15th International Congress on Hygiene and Demography, and Wm. C. Hanson, M. D., Massachusetts State Board of Health, Instructor in Harvard University and Massachusetts Institute of Technology, with the assistance of various contributors, American and Foreign, P. Blakiston's Son & Co., Philadelphia, 1915 (in print).

"The Modern Factory", George M. Price, M. D., formerly Director of Investigation, N. Y. State Factory Commission, John Wiley & Sons, 1914, 574 pp., $4.00.

"Occupational Diseases", W. Gilman Thompson, M. D., Professor of Medicine, Cornell University Medical College, New York City, D. Appleton & Co., 1914, 734 pp., price $6.00.

"Diseases of Occupation", by Sir Thomas Oliver, E. P. Dutton & Co., New York, 1908, 427 pp., price $3.00.

"Industrial Poisoning", Dr. J. Rambousek, translated from the German by Dr. Thomas M. Legge, Edward Arnold, London, England, 1913, price $3.50.

"List of Industrial Poisons", by Summerfeld and Fischer. Reprinted from U. S. Labor Bulletin No. 100, by the Ohio State Board of Health, with an Industrial Index. Discusses 54 common industrial poisons, branches of industry in which poisoning occurs, mode of entrance into the body, symptoms of poisoning, and measures for the protection of workers. A few copies of this are still obtainable from the Ohio State Board of Health. Enclose a two-cent stamp.

"Fatigue and Efficiency", by Josephine Goldmark, 890 pages, Russell Sage Foundation, 1912, price $3.50.

"Symposium on Ventilation", as reported in Journal of Industrial and Engineering Chemistry, March, 1914.

"Mortality from Consumption in Dusty Trades", by Frederick L. Hoffman. U. S. Labor Bulletin, No. 79, Nov., 1908.

Mortality from Consumption in Certain Occupations", by Frederick L. Hoffman. U. S. Labor Bulletin, No. 82, May, 1909.

Consult also any standard text-book upon Physiology (Howell, Stewart, Hall) and upon Hygiene (Harrington, Bergey) for effects of light, heat, fatigue and other hazards, vital statistics, etc.

The first fact to take cognizance of in the inspection of a workplace is the presence or absence of health-hazards.

An industrial *health-hazard* may be *defined* as any condition or manner of working that is unnatural to the physiology of the human being so engaged. This physiology is adaptable to quite wide variations in environment, but the rule holds absolute that the subjection to conditions which are unnatural to the physiology and habit of man results in pathology or disease.

Where a factory inspector looks for hazards to life, limbs and health, and is guided by the standards of protection which are present and which must not fall below a minimum required by law, the medical hygienist looks for hazards to health and longevity, and his standards are the presence or absence of well recognized hazards to health and the amount of occupational health complaints and diseases to be found. These latter he gets by interviewing and examining workmen themselves, their physicians, community health officials, vital statistics, etc. In a word, his business is to connect health-hazards with diseases and deaths. He is, then, both a hygienist and a diagnostician.

There is nothing strange or new, as a rule, about these hazards, but a proper conception of them and their effects is a necessary preliminary to the reports which follow.

Industrial health-hazards as they concern the industries of Ohio are listed, in an arrangement easy to remember, thus:

DUST,
DIRT,
DAMPNESS,
DARKNESS,
DEVITALIZED AIR,
TEMPERATURE,
FATIGUE,
INACTIVITY,
INFECTIONS,
POISONS.

As an aftermath to the above, it is necessary to mention *industrial stimulantism* which is usually alcoholism, coffeeism, or drugism. Stimulantism is promoted by subjection to one or more of the above health-hazards; or, because of the absence of good drinking water; or, because of a tradition among workers in certain lines that alcoholic liquors tend to stimulate them and to protect them from the effects of poisons, dusts, gases, or hard work to which they may be submitted; or to the fact that the employers promote alcoholism among their workmen by permitting the drinking of intoxicating liquors while at work; and, finally, to the fact that there is an absence of a welfare attitude, or an industrial efficiency department in connection with an establishment.—Coffeeism, in females, may represent alcoholism in males.

The second most important feature in the relationship between work and disease is the problem of the worker himself. Some workers are very much more susceptible to the health-hazards mentioned above than are others, so much so that as hygienic as certain industries and processes can possibly be made, still there are certain classes of persons who should not engage in them. This is exemplified today, in many instances, as a matter of natural selection; for instance, the more delicate and sickly disposed persons do not follow the more fatiguing or heat-exposing trades. Unfortunately this does not apply so closely to older workers who have been following the more hazardous undertakings for years, and who, having become weakened from various causes, still endeavor to remain at their chosen avocations, irrespective of the damaging effects upon the body. Much of this question of the human factor will be solved in the future by a selection of employes through physical examinations for occupations to which they are best fitted. As an economical principle this must be done for the benefit of employer, employe and society. Having picked the proper physically or mentally capable person for the position at hand, it is further necessary to eradicate health-hazards, as far as possible, if we expect to put a check upon unnecessary disease and a check upon the shortened span of life which exists among occupied persons today.

A third feature requiring discussion is that of being able to "get used to" the various health-hazards. This, many times, is a defence put up by employers, and even by employes for taking various health risks. It has some substance when superficially considered. For instance, the newly apprenticed barber soon gets used to the discomfort, pain and stiffness which first appears in the hand and arm using the scissors; the baseball player soon gets used to the muscular effort required in throwing the ball in the Spring practices, and is no longer inconvenienced by soreness, stiffness, etc. In this connection it may be said that fatigue is the factor concerned, and it is well known that what proves to be fatiguing to a person today may be performed at perfect east after a few days of experience. This is because a physiological regulation has taken place in which more blood, a better circulation and nerve control are established in the parts used and fatigue anti-toxin is developed to protect the body from fatigue toxin. Since this is a physiological adaptation, it must be considered perfectly normal. In other words, what was primarily fatigue, therefore a health-hazard, has, by a natural adaptation, become no longer fatigue. It is a phenomenon within the boundaries of physiology.

The vital point is: How far can such physiological adaptations take place without ultimate damage to the organism? We may state it as fundamental, that outside of the adaptation cited for fatigue, no other health-hazard can be "gotten used to". We mean accustomed to, in a physiologic, and therefore a normal manner. No person can become habituated to an existence in a damp, dark, or foul-aired place. Nor again to the inhalation of dust, to the constant exposure to high temperatures, nor to sudden changes in temperatures. The physiologic mechanisms of the human body are not capable of adapting themselves to the conservation of health and vitality in the continued presence of such hazards.

The subjection to poisons is absolutely incompatible with health and a normal span of life. It is commonly thought, for instance, that a person can soon become habituated to the inhalation of benzine fumes, so that the intoxicating effects, producing giddiness, dizziness, a feeling of elation and loquaciousness, experienced during the first week or so of exposure, but which, as a rule, pass off thereafter, have been "gotten used to". This is an erroneous idea. Apply the same argument to alcohol. Simply because it may take more to get the chronic toper intoxicated is no proof that he has become habituated because of a physiological re-enforcement. He has simply become tolerant. There is a vast difference between toleration and the physiologic normal. Toleration lasts only so long as the extra powers, with which all vital organs are endowed, can meet and compensate for the oppression. For instance, it has been shown that as little as 1/24th part of the normal amount of kidney substance will maintain life in the individual, and, in a similar way, other organs and parts of the body are superiorly equipped. But the utilization of physiological functions to their limits of toleration is abnormal and unnatural, and a transgression of natural laws is bound to result in disaster. This is just as true of physiology as it is of physics. Hence toleration of unnatural environmental conditions which many persons look upon as "getting used to" situations is untenable, and will finally result in disease, perhaps in invalidism, and most certainly in untimely death.

This misconception of the ability of the human being to become accustomed to health-hazards, such as the ten fundamental ones above cited, is responsible for a very large percentage of the preventable sickness and mortality shown in statistics herewith:

(1) In Ohio, in the year 1913, there were 68,378 deaths. Over half of these would not bear scrutiny as either timely or justifiable. Most of the questionable deaths occurred in adult life and before 70 years of age:

QUESTIONABLE DEATHS.

Lock Jaw	67
Tuberculosis (Total)	6,555
Cancer (Total)	4,049
Rheumatism	226
Anemia	240
Alcoholism	315
Nervous Diseases	6,882
ORGANIC HEART DISEASE	8,907
TOTAL CIRCULATORY DISEASES	11,358
Lung Diseases (other than Tuberculosis)	6,850
Bright's Disease (Total)	3,958
Skin Diseases	212
External Causes (violence, etc.)	6,266

As against these there were but 822 deaths charged to OLD AGE, as such.

(2) *Diseases of the Circulation* and particularly *Organic Heart Disease* are causes of death pre-eminent in adult life. The following table shows, for the State of Ohio, the increase in death rates per 100,000 population from these causes:

DEATH RATES.

Year.	*All causes combined* (*per* 1,000)	*Circulatory Diseases.*	*Organic Heart Disease.*
1909	12.76	155.95	108.26
1910	13.76	185.03	126.63
1911	13.09	206.95	157.32
1912	13.34	227.80	177.80

(3) Deaths occurring under 70 years of age from Circulatory or Heart Diseases should be considered preventable in the vast majority of instances. In Ohio, in 1912, over ⅙ of all deaths were due to Circulatory Diseases and ⅛ of all deaths were due to Organic Heart Disease alone. As a cause of death Tuberculosis has been almost doubly outstripped by these chronic degenerative diseases, 58% of which have occurred before 70 years of age, and 20% of which have occurred before 50 years of age. If the classification could enable us to separate out the "farmers", these rates for the balance of the people of the state would be very much higher.

A "Study of the Handicapped", made by the Council of Social Agencies and The Hospital Social Service in Cincinnati, states, "Cardiacs (i. e. persons suffering from heart disease) constitute at once the largest single class and the one that presents the greatest difficulties. Few of them, because, among other reasons, their handicap is not evident, at present obtain suitable employment. They are, therefore, constantly relapsing into incapacity for work and need hospital treatment."

(4) An analysis of the General Mortality Statistics for the registration area of the United States shows the following for the census year 1909:

MORTALITY AMONG OCCUPIED MALES.

	Those in Agricultural Pursuits.	*Those in* 131 *Trades and Callings.*
Deaths from *preventable* causes (6/7 are diseases)	27.4% of all deaths	43.0% of all deaths.
Deaths from *degenerative* diseases (under 70 years of age)	26.5% of all deaths	31.0% of all deaths.
Total deaths after 70 years of age	35.9% of all deaths	13.4% of all deaths.

In the above "Occupied Males" includes professional persons, officials, proprietors, those in domestic and personal services, as well as those we term real workers, viz., in trade and transportation, manufacturing and mechanical pursuits, mines, quarries, etc.

(5) The relationship between different callings and a given disease, such as *tuberculosis,* can be fairly satisfactorily determined. The following table furnishes an example. Compare the first column with the second column, and note that housing, habits, dietetics, etc., cut no figure, at least with the first four comparisons:

TUBERCULOSIS DEATH RATE.

Quarrymen and miners......	9. %	Stonecutters (indoor work).	29. %
Carpenters	10. %	Painters	19. %
Iron and steel workers.......	16. %	Brassworkers	31. %
Domestics	19. %	Stenographers	39. %
Farmers, planters and overseers	6.6%	95 out of 100 callings 8.0 to	43. %

In this connection the State Board of Health has issued a pamphlet entitled, "Consumption and Preventable Deaths in American Occupations", which shows many other ratings for trades and callings.

(6) *Pulmonary Tuberculosis* is a cause of death which concerns adults much more than children. Reliable statistics in Ohio are only available since 1909. It must be remembered that many Ohio persons suffering with tuberculosis go to western states where many of them die. Because of this morbidity migration in the case of this disease, the mortality rates of states such as Ohio are not as high as they should be. Reports in Ohio show that there are seven cases of tuberculosis to every death. Hence, there are over 35,000 living cases in the state at present. The rates for the last five years in Ohio are, per 100,000 estimated population, as follows:

Year.	*No. Deaths.*	*No. Deaths.*
1909	5,805	121.91
1910	6,176	129.70
1911	5,992	123.76
1912	5,679	115.80
1913	5,479	110.35

The table shows that the disease as a cause of death is gradually decreasing. But the table below shows to what extent young people bear the brunt of the plague:

DEATHS FROM PULMONARY TUBERCULOSIS, STATE OF OHIO, 1909-1912.

Years of Age.	*No. of Deaths.*
15-19	1,698
20-24	3,156
25-29	3,228
30-34	2,810
35-39	2,478
40-44	1,867
45-49	1,543
50-54	1,276
55-59	1,108
60 and over	3,187

(7) The following is abstracted from a paper entitled, "A Study of Causes of Tuberculosis", by Roy T. Nichols, Department of Hygiene, Western Reserve University. The study was made in Cleveland, and was devoted to the year 1912:

3,247 cases of tuberculosis were registered in Cleveland in 1912. Total number was probably 10% higher.

70% were estimated as charity cases.

"It is doubtful whether more than 15% could be attributed to an inherited tendency."

4 months represents the average stay of each patient in an institution (based upon 250 cases studied).

Cost for the care of each patient averaged $1.25 per day.

The report concludes as follows:

"Is it not time that we not only recognize as one must, that tuberculosis is not the inevitable lot of certain races, or the inherited lot of certain families, but that it is largely due to the effect of the industrial and living conditions, and that we must therefore expend large amounts not only in combating the disease by sanitary instruction and segregation, but by appropriations for the safeguarding of workers in certain industries and for the improving of housing conditions? If any conclusions can be drawn from this report, it is that all efforts to combat the rapid spread of tuberculosis must fail unless it reaches down to the economic basis of life. This report shows conclusively that men are succumbing to tuberculosis, not because they are destined to or because they are ignorant or because they are willing to take bigger chances than other people, but because they are the slaves of our industrial system that decrees this man who toils for 10 or more hours a day in dust-laden, overheated air, is the man with wages so small that he can buy for himself and his family only a few small close rooms for their place of habitation, rather than a place that has the recreative gifts of sunlight and fresh air. When we awaken to the fact that such industrial conditions and such living conditions must not exist, not only because they are not humane or decent, but because society cannot afford them, because they too rapidly manufacture these helpless derelicts that must be supported by charity until death relieves them and us, we will have gone far towards removing the cause of tuberculosis."

(8) The following Table, based upon U. S. Vital Statistics reports, compares the Proprietor and Professional Class (column A.) with the Working Class (column B.) in respect to the prevalence of *six preventable causes of death.*. The rates represent the number of deaths from each cause out of every 100 deaths:

Cause of Death.	A. *Death Rate.*	B. *Death Rate.*
Tuberculosis	8.22	17.53
Accidents and injuries	5.20	11.85
Pneumonia	6.89	8.48
Suicide	2.13	2.76
Typhoid fever	1,88	2.35
Accidental poisoning	.43	.78
All preventable causes	24.75	43.75

In this connection the State Board of Health has a pamphlet which explains more fully these relationships.

The above tables, we believe, will show the serious economical questions which are involved.

(*To be continued.*)

GENERAL PROCESSES.

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(*Continued.*)

FURNACING.

In addition to the processes concerned in the boiler, power and firing rooms, in a great number of industries, a certain number of employes are engaged in taking care of furnaces, baking ovens, kilns, and drying rooms, which are located within the interior of buildings, and oftentimes in the midst of surrounding processes, such as in foundry work, heating furnaces for cutlery and tools, enameling and japanning ovens, and the like. None of these furnacing operations are on the scale of the large heating furnaces, annealing ovens, etc., which are found in iron and steel mills, and which are considered under that heading.

This process of Furnacing was investigated in 15 establishments, covering a wide range of products, and employing a total of 157 wageearners, all males. An unskilled class of workers was usually employed, there were no unions, and they were apt to be a changing set of employes. In 7 places health appliances consisting of means to prevent the effects of excessive heat were present, such as movable screens, asbestos coverings to furnaces, electric fans, air blasts, and various mechanical contrivances to permit the workers to keep at a distance from the openings of the furnaces. In addition, some places had a large hood, connected with a stack, over furnaces areas, as well as exhaust fans and air-agitators within the quarters to remove escaping fumes, smoke or odors. Too often open windows, or roof vents (always more or less closed up in the winter time) were the only means depended upon for such ventilation. There was a tendency to employ youths and younger men at such work, while only 12 of the total of 157 workers were over 40 years of age.

The work was of a hazardous *dusty* character in 7 places, while *dirt* and disorder characterized the vicinity in 8 places. In 2 places the furnaces were located in very *damp* and steamy quarters, and, in 4, *light* was very poor. This occasionally was made much worse by the presence of smoke from the furnaces. In some instances, on the contrary, workers were compelled to face brilliant lights and intense heat, both tending to produce disturbances of sight (temporary blindness, blood shot eyes, corneal opacities, cataracts, and actual blindness from acute retinitis). The general room *ventilation* appeared good in 5 places, fair in 5, and bad in 5 (the latter due to deoxidation from the presence of the furnace in a closed-up room, contamination with the escape of gases from the furnace, pollution with dust, and sometimes smoke, steam and spray particles, stagnation from the absence of any means to promote circulation of the air, and greatly abnormal temperature-humidity relations). In the latter respect it was *extremely hot* in 3 places, where workers had to be, and more or less so in 8 more, while in but 1 or 2 instances were any shower baths at hand for the use of the furnacemen. In some 7 plants *fatigue* was a hazard, due to laborious work, and occasionally to piece-work. The workday ranged from 9 to 10 hours in all places, while in 10 places, only ½ hour was allowed for a noon recess. Other recesses depended upon the character of the work. The liability of contracting *communicable diseases* bore the same hazards as for other processes in the vicinity, but usually was great. There was also considerable hazard of chronic *poisoning* for most of this class of workers, the poisons extending over a large range, depending upon materials being baked or furnaced. The risk came usually from fumes and gases, but there were the additional hazards of poisonous dusts, and of handling poisons in many places. The opportunity for chronic gas poisoning from coal gases and unburned natural gas was good in numbers of places. The industrial inducement to *alcoholism* was quite pronounced in most places, and due to many factors (dust, heat, vitiated atmosphere, poisons, and the lack of opportunity for personal cleanliness).

The general *appearance* of these workers was usually below the average of those in surrounding processes, while in some places they complained bitterly of some one or another of the hazards above mentioned, all of which were usually plainly present. *Comments.*—The above delineation suggests the corrective measures necessary. In particular would we mention the installation of shower baths for all workers in such processes, both for physiological reasons as well as personal respect, while every effort should be made to keep the atmosphere which the workers are required to breathe, and to be otherwise subjected to, as nearly like that meant for their use by nature as possible. In no two places were hazards alike, so it is impossible to suggest specific improvements.

FORGING AND BLACKSMITHING.

This process is reported upon as investigated in 52 plants located in various parts of the State and in connection with the following industries:

Agricultural Implements; Automobiles and Parts; Brass Manufacturing; Carriages, Wagons and Parts; Railroad Cars; Electrical Apparatus; Ship Building; Steel Manufacturing; Foundries and Machine Shop Products; Marble and Stone Cutting; Iron and Steel Products; Scales, Balances and Cash Registers; and Rubber Works. In a general way the process was about the same wherever investigated. In the 52 plants there were 1,608 wageearners, all males, engaged in forging and blacksmithing. The number of employes varied in different plants from 2 to 250. Methods appeared to be modern in 32 places, fairly so in 13 more, and not so in the remaining 7. There were no labor unions. The attitude toward employes appeared good in 41 places, fair in 9 more, and bad in 2 other (small) places. In 36 places the workers were of an intelligent type, while in the remaining 16 they were largely ignorant foreigners. Workmen appeared to remain well in 46 places, fairly so in 5 others, and not so in 1 place. Health appliances, consisting principally of hoods and stacks over furnaces and forges to remove fumes and smoke, were good in 24 places, fair in 2 others, and absent in the remaining 26. In 9 plants there were either placards or special instructions along health lines. In 7 plants the workers enjoyed the privileges of sick benefit associations. In 17 places (usually small) practically all the workers were skilled, in 6 more about half were, while in the remaining 29 the large majority were unskilled labor. Of the total number of workers 225 were over 40 years of age, 1,373 between 20 and 40, and 12 under 20. The general construction of the shop was good in 23 places, fair in 11 more, and poor in the remaining 18. In 14 places other processes were going on in the forging and blacksmith shop.

Dust was a negligible factor in 22 places, a fair hazard in 19, and bad in the remaining 11 places, the latter including some of the larger plants. It consisted chiefly of sand, metal, forge deposits and soot. Quarters were *clean* and orderly, considering the nature of the work, in 16 places, fairly so in 16 more, and not so in the remaining 20. Dry sweeping during work hours was frequently observed. Dirt floors existed in many places. *Dampness*, due to wet grinding processes, dirt floors, and poor location, was bad in 3 places, fairly so in 4 others, and no factor in the remaining 45. *Light* was bad in 8 places, only fair in 14 more, but good in the remaining 30. Artificial light was very poor in numbers of places. In others some workmen were constantly exposed to the effect of excessive light and heat upon the eyes without the use of dark goggles to protect them. The *ventilation* of the shops was good in 15 places, fair in 20 others, and bad in the remaining 17, due, principally, to the absence of hoods or other means of drawing off fumes from forges and furnaces, of good roof ventilation for smoke and fumes, and to gas yielding salamanders and heating stoves, and occasionally oil fumes. The exposure to *heat* was a fair hazard in 23 places, and bad in 7. The effects of *cold*, due to inefficient heating, drafts, and passing from hot places to cold places, was bad in 14 shops, and a fair hazard in 6 others. For the type of men who are employed in blacksmith shops, the work is not ordinarily particularly *fatiguing*, but in 10 places hurrying piecework was evident, while in about half this number laborious work, long hours, speeding up, constant standing in one place, steady strain, faulty postures, jarring processes, and constant pressure of objects against the body, were hazardous features. In all places loud noises were present, and in about 1/3 were reverberating and so excessive and frequent that workers were necessarily deafened thereby. The workday was found to be 8 hours in 5 places, 8½ to 9 hours in 4 places, 9½ to 10 hours in 40 places, and 10½ hours in 3 places. The noon recess was 1 hour in 14 places, ¾ hour in 8 places, and ½ hour in the remaining 30. The liability to the contraction of *communicable diseases* was considerable in 30 places, fairly bad in 16 more, and negligible in the remaining 6, the chief hazards being spitting upon dusty floors, absence of cuspidors, common drinking cups, common towels, absence of inadequate washing facilities, improper closets, the lack of medical supervision (so as to keep out consumptive workmen especially), and the damaging influences of dust, dampness, fumes, heat, and cold, in places above mentioned. Further than this, overcrowding in some places, absence of first-aid equipment to prevent blood poisoning from trivial injuries, absence of hand pads or gloves, goggles, and the use of wiping rags from doubtful sources, were all noted. *Poisoning* by fumes or otherwise was a serious hazard in 23 plants, fairly so in 6 more, and negligible in the remaining 23. The chief danger was from chronic gassing, due to the escape of fuel fumes and smoke. In addition tempering and case hardening with lead, potassium cyanide and oil, were carried on in a number of blacksmith shops, (these processes are described elsewhere). The industrial inducement to *alcoholism* was considered negligible in 24 places, fairly so in 12 more, but considerable in the remaining 16, the principal features being inadequate drinking water facilities, and the exposure to the breathing of dust and fumes, and, in 7 places, of excessive heat without provisions to counteract its effects.

The general *appearance* of workmen was good in 28 plants, fair in 15 others, and bad in 4. (Reports on this were not returned in the case of 5 plants.) The chief *complaints* of the workmen were headaches, coughs, colds, rheumatism, and lumbago, which they charged to fumes and exposures; also excessive light, loud noises, in some places jarring processes, and in others the exposure to the hazards of other processes. A fairly common observation among workmen was impaired hearing. *Comments.*—The general effects of forging and blacksmithing are along the lines of wear and tear, with emphasis upon the breathing of contaminated air in a large number of places. Improvements should consist of impervious flooring instead of dirt floors, efficient hoods and exhausts over all furnaces, forges and grinding processes, cool air blasts and screens for workmen in hot positions, dark goggles for excessive light, cotton for the ears where noise is excessive, and, as in all hot processes, the providing of shower baths. The hazards mentioned above indicate further corrections.

According to the Ohio Vital Statistics Reports, there were 986 deaths among blacksmiths for the years 1910, 1911 and 1912, of which number 77 died of pulmonary tuberculosis, or 7.91%. This compares very favorably with the death rate from the same cause for all occupations in the State combined (13.3%), and even with agriculturists (7.13%). However, the vast majority of blacksmiths are in small, open and naturally well ventilated shops, rather than the large plants such as our investigators covered. According to the U. S. Census, 13.8% of blacksmiths died of heart disease, 11.4 of pulmonary tuberculosis, 10% of apoplexy, 9.7% of Bright's disease, and 8% of pneumonia.

COREMAKING.

This foundry process is too well known to require description here. It was investigated in the following lines of industry: Brass Founding, Iron

Founding, Iron and Steel mills, Agricultural Implements, Automobiles, Electrical Apparatus, Stoves and Safes, and several Machinery Manufacturing firms. Our reports are based upon investigations made in 31 plants. There were a total of 989 employed at the process, of whom 861 were males and 128 were females, the latter in 6 different plants. Union organizations existed in 2 places. An intelligent type of workers was employed in 2 places, fairly so in 9 more, and, in the remaining, the employes were largely ignorant foreigners. An excellent welfare attitude toward employes existed in 24 places, fairly so in 2 others and not so in the remaining 5. The workers in 27 places appeared to remain well at the process, fairly so at 3 places, and not so in 1. Health appliances, consisting of hooded drying ovens, workroom ventilating apparatus, goggles and respirators (the latter where needed), were good in 3 places, fair in 5, and absent in the remaining. In 6 places the employes had privileges of sick benefit and pension associations. The most of the workers were skilled in 18 places and unskilled in the remaining 13 (this feature depended chiefly upon differences in process). Workrooms were hygienically constructed in 16 places, fairly so in 8, and not so in the remaining 7. The work was done in the foundry room in 18 places (in none of which were females, although some were in places only partly partitioned off from the foundry atmosphere). On the other hand the core drying ovens were nearly always in the coremaking workroom.

Dust, consisting of sand, earths and mold powders, was a bad feature in 5 places, fairly so in 5 more, and negligible in the remaining 21. Quarters were *cleanly* in 20 places, fairly so in 4 others, and not so in the remaining 7. *Dampness,* due to the nature of the work and poor location, was a bad feature in [illegible] places. *Light* was bad in 4 places, only fair in 2 others, and good in the remaining 25. The general *aeration* of quarters was good in 14 places, fair in 14, and bad in the remaining 3, the factors being fumes and smoke, either from the foundry or escaping from the drying ovens. *Heat* was no factor in 22 places, was a fair hazard in 6 and bad in 3 places, due to proximity of core ovens which were improperly shielded and ventilated. On this account workers were often subjected to the effects of alternation between heat and cold drafts. *Fatigue* was a considerable hazard in 18 places, fairly so in 11 more and negligible in 2, due principally to hurrying piecework, monotony, constant standing, and less often to such features as laborious work, prolonged faulty postures, and loud noises. The workday was 8 hours in 2 places and from 9 to 10 1/6 hours in all but 1 place, where it was 11 hours. The noon recess was 1 hour in 2 places, ¾ hour in 3 places, and ½ hour in the remaining 26. The risk of contracting *communicable diseases* was negligible in 4 places, fairly so in 21 others, and bad in the remaining 6, due principally to inadequate washing facilities, poor toilets, promiscuous spitting, absence of cuspidors, use of common cups, and occasionally to overcrowding. Physical examination of workers was practically unheard of, although first-aid provisions were good in the majority of places. For a more or less dirty class of work such as this is, it is questionable from a health point of view whether sexes should be permitted to work together. The liability to occupational *poisoning* was negligible in 11 places, a fair hazard in 11 others, and considerable in the remaining 9, due to escaping gas fumes and smoke, principally from core ovens, and the breathing of brass fumes in many brass foundries where frequent pouring was done, and the coremaking was done in the same quarters. The inducement to *stimulants* was bad in 11 places, and considerable in 15 more, due to the lack of adequate drinking water facilities, places other than the work rooms and saloons in which to eat, and to the depressing influences above mentioned.

The general *appearance* of workers was good in 25 establishments, a goodly number were below par in 5 others, and especially were they so in the remaining place. The chief *complaints* of workers were the breathing of burned gas fumes and smoke which escaped from baking ovens, causing headache, nausea, and general ill health, also odors from inside toilets which were improperly ventilated. *Comments.* — Corrective measures consist in separating this process from the general foundry, providing seats with backs, and the proper ventilation or separate location of the drying ovens, to which must be added features of general sanitation. Less than 1/6 of the places were above criticism for hygienic, airy, light and sanitary quarters.

IRON FOUNDING.

Iron founding includes, properly, the melting of iron and pouring it into molds, which have been previously prepared by the molders and their helpers, and the subsequent opening of the molds, freeing the castings from mold dirt, and cutting off the "gates" from the castings. In the iron foundry the molders are the skilled workers, the firemen and furnacemen (see Furnacing), semi-skilled, while a considerable percentage of unskilled labor is employed as helpers.

Iron founding was investigated in 43 establishments, in 14 cities, employing a total of 4,721 wageearners, all males. The process was investigated in 11 industries, arranged in descending order as follows: Foundry and Machine Shop Products, 15; Iron and Steel Mills, 7; Stoves and Furnaces, 6. Agricultural Implements, 5; Automobiles and Parts, 2; Musical Instruments, 2; Brass and Bronze Products, 2; and one each of the following: Enameling and Japanning, Electrical Apparatus, Safes and Vaults; and Iron and Steel Forgings.

The Mortality Statistics among Molders, according to the Ohio Vital Statistics Reports have been discussed in Part IV, under the heading of Foundry and Machine Shop Products (*q. v.*). — According to the figures submitted by the Financier of the International Molders' Union of North America, the Ohio branch of the Molders' Union suffered 204 deaths during the five-year period from 1909 to 1913 for which death benefits were paid (there were 87 additional deaths not coming under the benefit privilege), the chief causes of death being, in order, pneumonia, 30; heart trouble, 30; tuberculosis, 27; and violence, 18. The Sick Fund of the same organization presents, also, through its Financier, the following statements and figures for Ohio, for the year 1913:

"The following list gives the ailments, the number of members receiving benefits, the number of weeks' benefits receivd under each heading and its percentage to the total number of weeks' benefits paid during the year (1913):

		No. Members (Ohio) Paid.	*No. Weeks (Ohio) Received.*	*Percentage of Benefits Paid.*
1.	Throat and Lungs	262	620	16.7
2.	Rheumatism	207	580	15.6
3.	Accidents	255	613	16.5
4.	Burns	132	286	7.7
5.	Heart, Kidney, Liver, Bladder	56	137	3.7
6.	Lumbago, Sciatica, Neuritis	107	231	6.2
7.	Intestines and Rectum	59	185	5.0
8.	Stomach	81	200	5.4
9.	Tuberculosis	12	41	1.1
10.	Miscellaneous	313	821	22.1
	Totals	1,484	3,714	100.0

"With but few exceptions in the months of January, February and March of each year the amount of Sick Fund collected has been exceeded by the sick benefits paid out. The only explanation for the large outlay that characterizes the first quarter of each year is the severity of the weather that particularly affects those who are subjected to the heat of the foundry during cast time, combined with the poor facilities that obtain in so many places for keeping the shops warm during the daytime.

"We can well understand that foundry conditions are such as to promote the prevalence of both throat and lung disorders, and also rheumatism. The violent changes in temperature, the drafts and dampness of the foundry, are conducive to suffering of this kind. It might truly be said that rheumatism in its several forms appears to be the nearest approach, if any, to what might be designated as an 'occupational disease.' We are not making this as a positive statement, but rather as a deduction from our records of 1913."

The places which our investigators inspected were non-union in 30 instances, union in 10 others, while this was not reported upon in the remaining 3. The employers' interest in the workers' welfare appeared good in 31 places, and at least fair in 8 more. The general type of workers was good in 24 places, fair in 8 more, but largely ignorant foreigners in 9 others. The majority of the workers appeared to remain steadily at the process in 37 places, fairly so in 2 others, and not so in 3. Especially devised health appliances, such as hoods and exhausts over furnaces, and exhausts and air conditioning systems for the foundry quarters, were good in 6 places, fair in 4 more, poor in 1, and absent in 31. Instructions concerning the conservation of health were given in an organized way in 4 places, and to some extent in 4 more. In 6 of the places investigated benefit associations existed among the employes (these do not include the benefits provided by the Molders' Union). Foundries were hygienically well constructed in 15 places, fairly so in 10 more, not so in 14, and not reported upon in the remaining 4. Other processes than Iron Founding were carried on in the same quarters in 19 of the plants visited. These consisted of Core-Making, Pattern Making (Wood-working), Metal Grinding, Brass Founding, Tempering, Machine Shopping and various others. The age-group estimations summed up as follows:

Age Groups.	*No. of Iron Founders.*
Over 45 years	149
Between 40 to 45	386
Between 20 to 40	4,082
Under 20	15
Not ascertained	89
Total	4,721

The presence of foundry *dust* appeared a negligible hazard in 7 places, fairly so in 17 more, and bad in the remaining 19. This dust was composed chiefly of mold sand, iron oxides, iron, dross, slag, cinders and dirt. Of these the first is to be considered the most harmful. While it is practically impossible to avoid dust in iron foundries, the presence of sub-processes, such as Casting Cleaning, and Furnacing, as well as other processes (mentioned above), which might be carried on in separate quarters, add greatly to the amount of fine dust floating in the air. A foundry is also a difficult place to keep *clean* and *orderly,* but in 10 places quarters were found exemplary, while, in the remaining 33, heaps of mold sand, slag, cinders, castings and patterns were allowed to accumulate more or less promiscuously, while little attempt was made to clean up quarters, windows, skylights, etc. Dirt floors were found to exist in about one-third of the places, while, on the other hand, in about the same number the work was done upon concrete floors. *Dampness* was a bad hazard in 5 foundries, fairly so in 5 more, due to the wetting down of the earths used, careless cleaning of castings, wet grinding, and the absence of floor drains, as well as the difficulty of drying out earth floors within a building. Natural *light* was good in a total of 30 plants, fair in 7 more, and bad in the remaining 6. A great many plants were supplied with eye-damaging, expensive and inefficient artificial lighting by naked electric lamps (without reflectors or other illuminating enhancements). The *air* content appeared good and capable of being kept fairly free of contaminating gases and smoke in 13 places, to a less extent in 17 more, while it was bad throughout most of the day in 11 more. The usual contaminations were mold fumes, gas fumes, smoke, dust, and steam, while in a number of places the air was badly vitiated during the winter seasons by the presence of coke-burning salamanders used for heating, placed about in the quarters, and yielding immense amounts of invisible coke gas due to the absence of flue connections to the outside. While there is a necessary exposure to *heat* in the foundry process, it was usually short-intervaled, and a negligible hazard to the workers so employed in 20 plants, fairly so in 15 more, but bad in 7. In a number of places it could have been greatly lessened by protective devices, more room for its diffusion, ventilating fans, air blasts, and the like. On the other hand, *cold,* due either to the absence of inefficient heating, or the rush of cool drafts through areaways, was considered a hazard to many workers, in at least 15 places. This was so, particularly, for workers about the outskirts of the quarters who were standing before benches the greater part of the day. It is but natural that chilling of certain muscles and groups of muscles, which at intervals must be called into sudden severe straining actions, usually in hot places, should be greatly affected with sprains and rheumatism, shown as lumbago, wry neck, sciatica, neuritis, severe chest and shoulder pains, stiffness of joints, etc. Particularly is this condition favored by the going out-of-doors to closets, or at noontimes, or going home while wearing sweaty underclothes. Foundry work cannot be considered unduly *fatiguing* to the average normal adult, but it may be made so by such factors as the following, which were found to be present to the extent mentioned: hurrying piece-work, 22; speeding up, 8; overly laborious work, 7; monotony, 9; long hours at the manipulations concerned, 7; jarring processes (pneumatic tampers), 5; prolonged strain, 2; constant standing in stooped and awkward positions, practically all. The workday was 8 hours in 2 places, 8 to 9 hours in 12 places, 9 to 10 hours in 19 places, 11 hours in 1 place, and 12 hours in 1 place. The noon recess was 1 hour in 9 places, ¾ hour in 6 places, and ½ hour in 27. Overtime was quite unusual. The liability to the contraction of *communicable diseases* was a considerable risk in all except possibly 6 places. The chief reasons were promiscuous spitting into places in which the dust was being continually "kicked up," the absence of cuspidors, and, somewhat less often, to poor washing facilities and closets, as well as crowding together of workers. In a very few plants medical supervision protected against the presence of the consumptive worker and in all such first-aid equipment and hospital arrangements were excellent. There was not much liability to *poisoning,* outside of the intervalled breathing of certain amounts of gas, as far as iron founding itself was concerned, but in a number of places brass chills, from the escape of brass fumes, and tempering, or case hardening with lead and potassium cyanid were a hazard to the founders as well as to the special process workers. The relationship of industrial *alcoholism* to iron founding may be stated as directly in proportion to the subjection to the hazards named, especially fumes, smoke and dust, absence of proper washing facilities, and inadequate thirst-assuaging provisions. Furthermore, in numbers of places foundrymen ate their lunches largely in saloons, unquestionably as much from a desire to get out of the foundry air as for any other reason.

The general *appearance* of the average of foundrymen was considered good in 18 places, fair in 12, and much below par in 8 (the remaining 5 not being reported upon). The chief *complaints* of foundrymen were the inefficiency of ventilating arrangements, which necessitated the breathing of gases and smoke, particularly in the winter time, the absence of local exhaust systems to handle slag dust, dust and noises from other processes, and shortcomings in sanitary arrangements. Of specific *occupational diseases,* our investigators observed 2 cases of lead poisoning, due to lead tempering in the foundry quarters. The effects of great heat upon the face and skin were commonly noted. There were lots of *complaints* of bronchitis, rheumatism, diarrheal attacks and cramps in warm weather (the last two usually laid to drinking cold water, but recognized as due to poisons generated within the system by over-heating and fatigue), inefficient winter heating, poor or distantly located closets, and other questions under general hygiene.

Comments.— Probably the greatest single need in foundries is "back stop" cuspidors and warnings to keep sputum confined so as not to contaminate the dust in the atmosphere. Next, and equally as important, the presence of a shower bath with instructions upon its physiological purport. Next we would mention the doing away with dirt floors as soon as possible, and the presence of other poisonous or hazardous processes. The subject of drinking water is a most important one, and attention should be given to bubbling fountain supplies conveniently located, and the water supplied at a proper temperature, neither too warm nor too cold. This was done in some places. In certain processes men should wear dark goggles to protect the eyes from excessive heat, as well as light, while there should always be respirators available to be worn temporarily for unavoidably dusty manipulations. Hand protectors should be provided for handling hot scrap and iron. As there is some danger from "gassing" in all foundries, first-aid equipment should include a resuscitation apparatus as well as a tank of oxygen. Founding is an example of an industry which in itself should be harmless, in fact, should promote health and longevity the same as any application requiring the general use of nearly all of the body functions. It is rendered dangerous chiefly because it is done indoors. On this account a great many precautions are necessary to be taken, as indicated, including the general medical supervision of the workers.

PNEUMATIC TAMPERS are veritable engines of destruction to the human nervous system, and mechanisms should be introduced to take the jar off the worker as well as instructions in the proper physiologic use of the same.

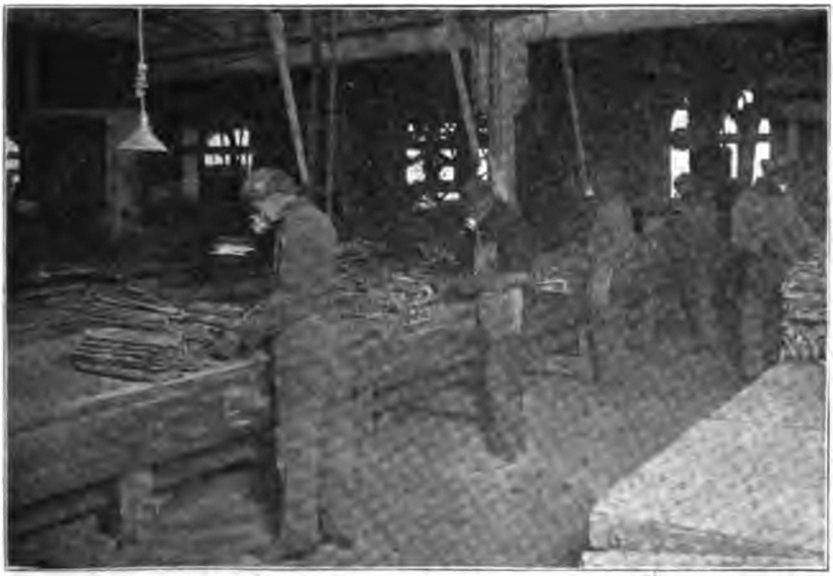

FIG. 38. CLEANING METAL CASTINGS.

An unavoidably dusty and gaseous work. Note exhaust pipe beneath table, which has openings into table top. Also respirators are necessary. Gloves furnished.

CASTING CLEANING is necessarily very dusty as usually performed and whether done by hand with steel brushes, or with sand and air blasts, or by knocking and tapping, laborers so engaged should be protected from the dust, probably best by helmets supplied with compressed air blasts. *Tumbling* of small pieces or cleaning within cabinets, or other dust confining means should be used where possible.

BRASS FOUNDING.

Brass Founding is very similar in methods of procedure to Iron Founding, except that a number of small melting furnaces are commonly used. These may be sunk beneath the floor level and crucibles placed within them to hold the metal or small steel furnaces mechanically handled and furnished with a strong blast may be used. There are many other types of furnaces. The castings made are as a general rule much smaller than those turned out in iron foundries, and in much greater variety of shapes. In the brass foundry practically all non-ferrous metals may be melted down, but the commoner ones are zinc, copper, lead, aluminum, bismuth, tin and antimony, as well as some phosphorus, nickel, manganese. In this connection we have included in Brass Founding all processes requiring the melting down and pouring into molds of non-ferrous metals, with the exception of some printing and engraving special machine processes.

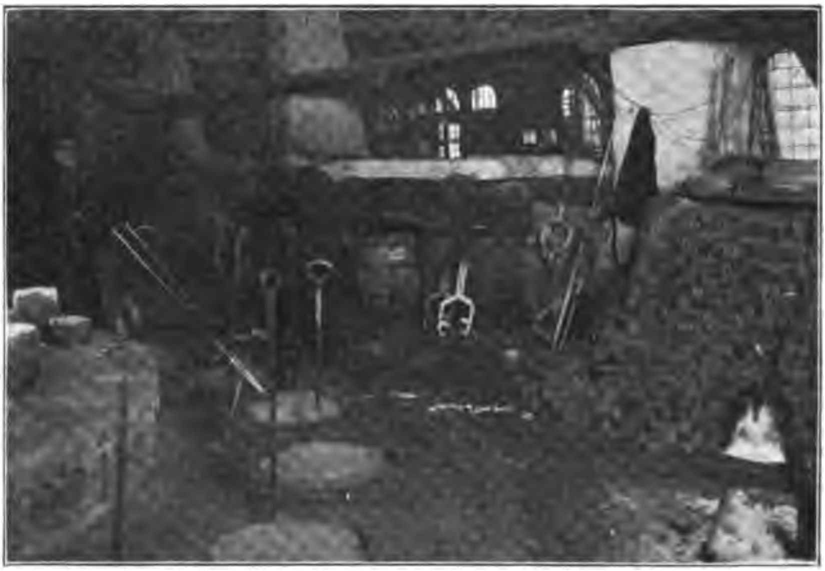

FIG. 39. BRASS FOUNDRY.

Each furnace (in the floor) is covered with an iron lid. The furnaces form a circle around the flue or chimney, the base of which is shown on the left. Note the pipe above from which fresh air is blown upon furnacemen when opening furnace tops.

Our investigations covered 106 establishments, located in 8 cities, and employing 2,148 wage-earners, all males. Non-ferrous metal melting was investigated in connection with the following industries, arranged in descending order: Brass and Bronze Products, 54; Electrical Apparatus, 10; Stereo- and Electrotyping, 5; Iron Founding and Machine Shop Products, 5; Smelting and Refining, 4; Lead Bar, Pipe and Sheets, 3; Coffin Fixtures, 3; Automobiles and Parts, 3; Iron and Steel Mills (brass foundries), 2; Printing and Publishing, 2; Cutlery and Tools, 2; Junk, 2; Cash Registers, 2; Paint and Varnish Manufacturing, 2; Flags and Regalia, 1; Stencils, 1; Musical Instruments, 1; Railroad Cars, 1; Street Cars, 1; and Rubber Manufacture, 1.

Vital statistics unfortunately do not distinguish between Iron Molders and Brass Molders, as a rule. (Attention is called to the statistics given in Part IV under "Foundry and Machine Shop Products," and to "Brass and Bronze Products;" also to "Iron Founding," Part V.) We call attention to the relative rates given in the U. S. Mortality Statistics for pulmonary tuberculosis as occurring among Iron and Steel Workers and Brass Workers. In the former it is the cause of 16.3 deaths out of every 100, and in the latter 31.3 deaths in every 100.

The plants investigated employed from 1 to 275, a large majority ranging from 3 to 20. The molders belonged to unions in 6 of the plants. The general attitude toward employes seemed good in 50, fair in 21, and quite bereft of personal interest in the remaining 35, usually smaller places and engaged in some of the odd lines mentioned. The class of workers was good and very largely skilled in 65 places, fairly so in 29 more, and not so in the remaining 12. In 25 of the places investigated the workers were only of short tenure, and not much better in 14 more. In 16 places exhaust hoods and vents were found over furnace areas, while in 25 more various arrangements to improve the atmosphere, such as air blasts and exhaust fans, were present. In no place were means adopted to confine and remove brass fumes during pouring. In 8 places instructions concerning the conservation of health were given in an organized way, and some attention was given to this in 6 more, but comparatively nothing in the remaining 92. Brass foundrymen were privileged to join sick benefit organizations in 10 establishments. The general construction of brass foundries was determined as hygienically good in 42 places, fairly so in 21 more, and not so in the remaining 43. In 29 places other processes than those concerned with brass founding were being carried on, chiefly, Coremaking, Metal Grinding, Casting Cleaning, Machine Shopping, Polishing and Buffing, Assembling and Finishing Processes (see Factory Processes). Age-group estimations summed up as follows:

Age Groups.	*No. of Soft Metal Founders.*
Over 50 years	40
45 to 50 years	120
40 to 45 years	296
20 to 40 years	1,670
Under 20 years	22

The general hazards of ***dust, dirt, dampness, darkness, heat, cold, fatigue*** and ***infections*** did not differ materially from those already described under Iron Founding. The workday was found to be 8 hours in 5 place, 8 to 9 hours in 42 places, 9 to 10 hours in 58 places, and between 10 and 11 hours in 1 place. The noon recess was 1 hour in 13 places, ¾ hour in 14 places, ½ hour in 76 places, and not strictly observed in the remaining 3. A morning lunch interval was occasionally observed, but with piece-workers this was quite a question of their own choice. The ***air*** conditions in these founding processes were determined as good in 17 places, only fair in 41, and decidedly hazardous to the health of the workers in the remaining 48. While quarters were usually spacious enough, the air was subjected to vicious contamination with brass fumes, usually, also, some lead fumes, in addition to the features mentioned under Iron Founding. While these fumes were only a matter of ten to fifteen minutes during pouring in smaller places and once or twice a day, they became very detrimental to health where they were more or less continuously present.

In addition to brass fumes (the *poisonous* element of which is pre-eminently zinc, and causes when inhaled "brass chills," or "brassfounders' ague"), and lead (present as a hazard through handling, chiefly, but also in the form of dust and fumes), the following poisons were reported by investigators; antimony, sulphur dioxide, carbon dioxide, carbon monoxide, benzine, phosphorus and "salamander gases." These were usually present in small amounts only, but very liable to produce slow poisoning.

Because of the element of zinc, and also antimony when present, (the breathing of the hot fumes and sublimation products of which cause a drying harshness and soreness in the nose, throat and chest, and oftentimes a nausea and loss of appetite) the industrial inducement to *alcoholism* is much greater among these workers than among Iron Founders. It seems to be a tradition with brass molders to resort to stimulants for the sole purpose "of cutting the slug" in the throat, and to reduce the likelihood of brass chills, as well as "metal poisoning."

The average *appearance* of the workers was good in 62 places, fair only in 27 more, and bad in the remaining 17. In 42 places brass chills were complained about, while other *complaints* were about the same as those mentioned under Iron Founding. In 35 plants our investigators encountered the following cases of *industrial disease* complaints: brass poisoning (including "chills" mostly, but occasionally "brass itch") 104, and 40 others who said they had had chills in the past, or in places where they had previously worked. In some places 1/3 to ½ of the workers were suddenly stricken, usually in the winter time, during snowstorms, when the fumes hung about especially heavy within the quarters. As is the rule, these chills came on at night time several hours after the workers left the foundries. The wholesale manner in which they appeared was occasionally mistaken for an epidemic of some sort, resembling influenza. In addition to the above, our investigators discovered 4 cases of chronic lead poisoning, 4 others which were tentative, and 3 others who had been afflicted in the past with lead poisoning. There was also reported 1 case of chronic eczema, 1 case of benzine dermatitis, and many complaints of catarrhal conditions of the nose, throat and stomach.

Comments.—In addition to what has been said under Iron Founding, means should be taken to locally ventilate brass pouring areas. This may be done by means of broad hoods, connected with tall stacks, or a suction fan, and each hood capable of raising and lowering over the pouring area. Another method is to apply an exhaust hood, connected with a flexible duct, immediately over each crucible and its pouring edge, and lead the fumes off to a collecting chamber. While crucibles are being transported from furnaces to molds, practically all the fumes can be kept down by covering the surface of the metal with a little slag or sand. A hood or apron applied over the furnace area will usually provide for removing fumes which arise when the furnaces are opened and the crucibles are removed, and lead and other ingredients added. A factory check upon the reasons why employes absent themselves from work would prove instructive to employers and bring out the preponderance of preventable causes.

(To be continued.)

THE POISONS SECRETED BY ANIMALS.

E. F. McCampbell, Ph. D., M. D.
Secretary and Executive Officer, Ohio State Board of Health.

(Concluded.)

NATURAL IMMUNITY TO SNAKE VENOMS.

It has been known for many years that certain animals possess a natural immunity to the venoms of various snakes and other poisonous animals; for example, the mongoose, the hedgehog, the pig and certain species of herons. Certain non-poisonous snakes are immune to the venom of poisonous ones. The natural immunity of the mongoose and the hedgehog to snake venom is due to several factors. In the first place, in case of the mongoose, the animal is especially agile, and on this account avoids bitten by the snake. Furthermore, frequently it suddenly attacks the snake, biting it and crushing the head with its jaws. Rudyard Kipling in his Jungle Book gives a very graphic description of the mongoose attacking the cobra and illustrating the last mentioned point. Furthermore, it has been demonstrated that the blood of the mongoose possesses natural antitoxin against the venom of poisonous snakes. This can be very easily demonstrated by injecting mixtures of mongoose blood serum plus venom into susceptible animals such as rabbits.

In the case of the hedgehog the numerous spines on the body of this animal render it less liable to be bitten by poisonous reptiles, and in addition to this it is very agile and avoids being bitten by the snake as in the case of the mongoose. It has also been demonstrated that the blood of the hedgehog contains some natural antibodies against the venom. The natural immunity of the heron has not been satisfactorily explained, but it probably rests upon the same basis. In the case of the hog it is probable that the immunity is due largely to the fact that there is a very thick layer of adipose tissue under the skin, which is comparatively non-vascular, thus preventing the absorption, at least the rapid absorption, of the venom. It has been shown that when the pig in injected intravenously with venom, it readily succumbs, and that there are no natural antitoxins in the blood as in the case of the other animals above mentioned.

A consideration of the subject of immunity to snake and other animal venoms is not complete without mentioning something in regard to snake charmers. In every country in which poisonous snakes are found in abundance there are certain individuals who profess to be secure from the ill effects of the venoms, due to the possession of natural or artificial immunity. They very frequently refuse to give the secrets of this condition, passing it down from one generation to the next. Calmette and others have investigated this proposition to some extent and come to the conclusion that there are individuals who are partially immune to venoms of snakes, but by no means are all so-called snake charmers immune. In certain instances it has been found that the fangs of the snake are removed in order to prevent the animal inoculating its venom. In certain instances however, the fangs are left intact and the individual adroitly avoids being bitten because of a perfect knowledge of the snake and its habits.

India is pre-eminently the country of snake charmers. There is an entire caste of Hindus who are professional catchers and dealers in snakes. These men, however, are not the regular snake charmers, these latter individuals being recruited from an entirely different caste in Bengal. Calmette has given a very interesting account of the snake charmer in India and his activities. I quote as follows:

"These men, who are usually clothed in yellow robes and wear large turbans, manage the cobra with really marvelous skill. All travelers who have had the opportunity of crossing India or of touching at a port on the coast or on that of Ceylon have witnessed scenes similar to that described by Rondot.

"Towards six o'clock in the evening a Hindu juggler comes on board. He is poorly clad, and wears a turban decorated with three feathers, and several necklaces of those amulet-sachets called gris-gris in Senegal. In a flat basket he carries a spectacled Cobra-di-Capello.

"This man instals himself on deck; we sit down on the seat provided for the officer of the watch and the sailors form a circle. The basket is placed on the deck and uncovered; the Cobra is coiled up at the bottom of it. The juggler squats a few paces off and commences to play a slow, plaintive and monotonous air, with a kind of small clarinet.

"By degrees the snake moves, extends itself, and then assumes an erect posture, but without quitting the basket. It begins to appear uneasy and endeavors to recognize its surroundings; it becomes agitated and irritated, expands and spreads out its hood, breathes hard rather than hisses, and frequently and quickly shoots out its slender forked tongue; several times it makes a violent dart as though to attack the juggler; it frequently trembles, or rather gives sudden starts. The juggler keeps his eyes always fastened upon the snake, and gazes at it with a singular fixed stare. After some time, about ten or twelve minutes, the cobra becomes less animated, grows quiet, and then sways as though influenced by the slow and monotonous rhythm of the musician. Little by little it is brought to a sort of somnolent condition. Its eyes, which at first watched the juggler as though in order to take him by surprise, are, to a certain extent, fixed and fascinated by the latter's gaze. The Hindu takes advantage of this moment of stupefaction on the part of the snake by approaching it slowly without ceasing to play, and touches the head of the Cobra, first with his nose and then with his tongue. Although this takes but an instant the reptile starts out of its sleep, and the juggler has barely time to throw himself backward so as not to be struck by the snake, which makes a furious dart at him.

"We doubt" says Rondot, "whether the Cobra still has its fangs, and whether the Hindu incurs any real danger in approaching it. Accordingly we promise our man a Spanish piastre if he will make the snake bite a couple of fowls. A black hen, which struggles violently, is taken and offered to the cobra, which half rises, looks at the bird, bites it, and lets it go. The fowl is released, runs off terrified, six minutes later, by the watch, stretches out its legs, and dies. A second fowl is placed in front of the snake, which bites it twice, and the bird dies in eight minutes."

In all probability snake charmers owe their immunity in certain instances to graded inoculations of the venom. The venom is frequently rubbed into wounds on the skin after it has been thoroughly mixed with mud. Furthermore, in some instances certain roots are ingested at the time the venom is rubbed in. In summing the situation up in regard to snake charmers, it may be said that man does not possess a natural immunity to the venoms, but may devlop in himself in certain instances an acquired active immunity by a graded inoculation of the venom. This active immunity is not absolute for when inoculated individuals are bitten by venomous reptiles they very frequently show pronounced symptoms.

The Toxicity of the Blood of Venomous Snakes—Certain physiologists and biologists have explained the immunity of certain nonvenomous snakes to the venom of poisonous snakes as being due to the presence of an internal secretion of the venom. It has been shown, for example, that the blood of certain fishes, such as the eel, the salamander and the toads when inoculated is distinctly toxic and in certain instances they produce death in susceptible animals due to asphyxiation. It has also been shown that the blood of poisonous snakes is also frequently toxic, as for example, that of the cobra. It is supposed that these toxic substances in the blood as a matter of fact are not secreted by the poison glands of the snake but are produced by various cells of the body, and are diastatic in nature, and that they represent certain constituents of the venom which are found in the poison glands. There can be no doubt, however, that the natural immunity of snakes to their own venom and the natural immunity of non-venomous snake to the venom of poisonous ones is due to the fact that they are rendered naturally immune due to the presence of these toxic substances in their blood.

The blood serum of the rattlesnake and the copperhead is distinctly hemolytic for the blood corpuscles of various animals. It has also been shown that they are in certain instances cytolytic for various organs of the body such as the spleen, kidney, muscles, etc. It is however clear that these poisonous substances which are present in the sera of various cold blooded animals are not true venoms, but protect the animal against the true venoms of poisonous animals.

OTHER VENOMS OF THE ANIMAL SERIES.

So far we have given particular attention to the consideration of the venoms of snakes. In conclusion I wish to call your attention to some of the venoms which are produced by other animals. A great many of these venoms are similar in chemical constitution (as near as can be determined) to those of snakes, others are quite different. On the whole they have not been studied as much as snake venoms and a very interesting field of research here presents itself.

Protozoa—Many of these single celled, lowest forms of animal life are capable of producing disease. In a broad sense they produce venoms. We call them toxins as we do the poisonous products produced by bacteria. The secretions of these single cells are distinctly poisonous in certain instances. The venom is the product of one cell instead of many cells. The best known members of this group are the *Entamoeba coli* and *tetragena* the causes of amebic dysentery, the *Plasmodium malariae,* of which there are several species, the cause of malaria, the various trypanosomes producing disease in man and animals such as *Trypanosoma gambiensa* the cause of sleeping sickness; the various piroplasma, such as the *Piroplasma bigeminum* of Texas fever, etc.

Coelenterates—Among the coelenterates there are a few species which produce poisonous substances. Perhaps the best known member of this group is the *sea anemone,* the tentacles of which secrete toxic substances, which cause itching, puritis and urticaria. The poison itself is known as *thalassin.* It takes about one kilogram of anemone to yield three grams of pure crystaline poison. It is said that the anemone causes a malady among the sponge divers in the Mediterranean sea, especially those who bring the anemones to the surface with the sponges. The malady seems to be especially virulent in August and the late summer months. In addition to the symptoms above referred to there may be ulceration of the skin and various membranes of the body, headache, fever, pain and thirst. The sea anemone is also toxic when ingested and is used purposely for the poisoning of animals.

Echinoderms — Among the echinoderms the sea urchin is the best known venomous species. The venom is secreted in the sticky mucous which produces death among the smaller crustacea and fishes. The sea urchin is equipped with soft prehensile organs called pedicullariae. These turn toward the point of stimulus and secrete the venom which intoxicates the animal attempting to feed upon the urchin. An interesting thing is shown in the protection of a normal serum from one animal against the action of sea urchin venom in another. Frog blood serum for example has been shown to possess natural antitoxin against sea urchin venom, so that when it is injected into a crab, which is particularly susceptible to the venom of the urchin, it will protect this latter animal against the effects.

Arthropods — There are several members of this group that secrete poisonous substances. The first group to which I would direct attention is the spiders. On each side of the mouth of the spider is an appendage which ends in a sort of a fang which opens into the duct of the poison gland. This venom is fatal to all small animals, such as flies and other insects. In man it produces pain and considerable swelling. Serious results have been reported from the bites of certain species. There is a species in Chili which is said to be especially fatal for cattle (Latrodectus mactans). There is another species in New Zealand which seems to produce serious intoxication among the natives (Latrodectus seelio). The natives are usually bitten while collecting sea weed, and it inspires great dread among them, so that they frequently burn buildings to the ground in order to kill these pests. The tarantula is one of the best known species of spider which is toxic. The poison produced is known as arachnolysin. It possesses a marked affinity for the red blood corpuscles of certain species and is distinctly hemolytic. An antitoxin by the name of antiarachnolysin has been prepared by ammunizing animals with the poison, and it is very efficient in combatting the action of the poison. Scorpions — The inoculatory apparatus of the scorpion is on the last abdominal segment. This segment is swollen and globular and is terminated by a hard curved spine with a very sharp point. The poison glands are two in number and are located in this last segment and are separated from each other by a septum. The contraction of this septum causes the ejection of the poison. The scorpion always stings in front by bending the abdomen in a bow. It proceeds, for example, as follows: it seizes the insect such as spiders and flies in its pincers, bows the abdomen and drives the sting in. When the scorpion is on the defensive, however, it bows the abdomen first, then returns to the normal position by a quick contraction of the abdominal muscles. The poison produced is a distinct neurotoxin. It is interesting to note in this connection that the blood of scorpions is antitoxic for venoms of other poisonous arthropods. Myriapods — The best known myriapod without doubt is the *centipede*. This animal is possessed with postmaxillary appendages which inoculate the venomous secretion. They feed almost entirely on spiders and insects. They do not produce fatal poisoning in man, but very often occasion extreme pain and insomnia. Insects — A large number of insects produce irritating secretions which broadly must be termed venoms, which serve as a means of defense, and for the purpose of killing prey. The secretions are somewhat different from the true venoms. For example, in this group we have the wasps, the hornets, melöe or oil beetles, cantharis or blister beetles, the bees, mosquitoes, etc. There are three kinds of glands in the poison apparatus of the various species. First, acid glands, second, alkali glands, third, excessory poison glands. The venom of bees and wasps has been most studied. This venom contains a neurotoxin and also a hemolysin. The eggs of bees contain venomous substances similar to those produced by the toad and certain vipers. It has a fatal effect upon mice and sparrows, but in man only produces an irritating action. Certain of the mosquitoes are interesting in this connection. The venomous secretions in these insects when injected under the skin serve to cause an active hyperemia of the part and consequently the blood can be more easily taken up than before.

Certain gastropodous molluscs possess glands which throw out venoms which are able to produce paralysis in certain of the smaller animals. These secretions serve the purpose of defense and also for the securing of food. Sea and fresh water fish such as carp are very sensitive. It has no effect upon warm blooded animals. Perhaps the best known members of this group which are poisonous are the octopi and devil fish. The octopus is possessed of two pairs of salivary glands, a small anterior and a large posterior. The cuttlefish has only the posterior gland. The anterior glands are acid. The posterior glands are viscid and the venom secreted produces an immediate paralysis of the crustacea. When the octopus or cuttlefish catches some crustacean, for example, in its tentacles, it bites it, and injects the venom and immediately releases it. It is thus in no danger of the pincers of the crustacean and the venom has an immediate paralyzing effect. When the prey is sufficiently paralyzed the octopus proceeds to devour it.

Fish — The means of defense exercised by certain of the fishes is quite varied. Some species discharge electricity, such as the tarpedoes, electric rays and electric eels. Others are provided with poison glands and inoculatory organs which are usually composed of opercular spines or fin rays. There is only one genus of poisonous fishes which has the inoculatory apparatus in the mouth and connected with the teeth, similar to snakes, and that is the Genus mürdena. The glands usually are located at the base of the dorsal or cuttle fins. When some animal comes in contact with these spines they inflict a wound and inject an irritating venom. The flesh of these fish is not always poisonous. There are, however, some species of fish in which flesh is decidedly poisonous. Nearly all of the poisonous fish are sedentary and the prey are active. It has been noted especially that during the spawning season that the venom glands are very active, and that there is an increase in the toxicity of the venom. In certain species venom is produced only at this season of the year. The venom is bluish and slightly acid. In certain instances it produces a very acute pain which extends through the limb, and cases of delirium, the result of severe pain, are on record. This venom seems in a way to act similar to the venoms of certain snakes in destroying the bactericidal power of the blood, so that a septicemia and gangrene from various bacterial micro-organisms may result.

. The Genus mürdena, above referred to as the only poisonous fish with the inoculatory apparatus in the mouth, is an elongated animal very similar to an eel. The poison gland or pouch is located above the membrane of the palate and contains about ½ cc. of venom. The fish possesses three of four conically curved teeth with the convexity in front similar to snakes. There is, however, no canal in these teeth, the venom flowing out between them and the mucous membrane of the palate, which forms a sheath. The sheath is withdrawn and consequently the teeth penetrate the tissues when the jaws are brought together. The teeth are mobile and are attached to the palatine bone by means of fibrous tissue. At rest, the teeth are deflected back against the mucous membrane of the palate with the possible exception of the third tooth which is always somewhat erect and is the most used in inoculation. None of the teeth can be protruded beyond the vertical, differing from snakes in this respect. The venom of this genus possesses a marked digestive or diastatic action. It is in all probability very useful to the fish in the digestion of protein material, such as other dead fish, etc.

Batrachians — The batrachians are devoid of any inoculatory apparatus. Poison glands are located in the skin and in the parotid region. The best known members of this group are the salamanders, particularly the Giant Japanese salamander. The venom of this salamander is very similar to certain snake venoms. In ancient times this animal was eaten with the purpose of curing various disorders. The secretions containing the venom are viscid, containing a large amount of mucous, have a very nauseous odor and are slightly toxic. When injected into susceptible animals, they produce convulsions and an arrest of respiration. Pliny says "the fluid which flows from the mouth and resembles mucous, eats away human hair." Another member of this group which is quite common is the toad. Venom is secreted by the parotid gland as well as by the skin. It is yellowish in color, has an acid reaction and contains a large percent of mucous. It is thrown out on the skin and around the mouth when the animal is on the defensive. On injection the venom which is known as bufotin produces paralysis of the heart, and it is in fact a distinct ***neurotoxin***.

Lizards — The most noted venomous lizard is the Haloderma horridum. It exhales a strong nauseous odor. The venom is secreted by the glands of the skin as well as by certain of the salivary glands. It is whitish and slimy in color and is not particularly virulent. When inoculated by biting into a susceptible animal it produces localized swelling and a temporary paralysis of the body. There is also salivation and loss of control of the sphincters.

Mammals — There is only one venomous mammal and that is the Ornithrohynchus paradoxus or duck-bill, which is a native of Australia. It has two horny teeth in the upper jaw, and a broad tail, and resembles a beaver in some respects. Its legs are webbed, short, and it has five toes with very strong claws. On the hind feet of the males there is a spur which connects with the orifice of a gland secreting venom. The animal inoculates the venom by driving in the spur. The venom produces edema, swelling and in certain of the lower animals, death. This venom is especially active during the breeding season.

So much for a brief consideration of the poisons secreted by animals. If I have succeeded in interesting you in certain phases of this great field, I shall deem it worth while.

METHODS AND CHANNELS OF INFECTION.

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(Concluded.)

VARIATION IN INFECTION.

It should be noted that there may be a variation in the infection depending upon the route by which the infectious microörganism enters the body. For example, in the case of *Bact. tuberculosis* if the bacterium enters the skin a usually non-fatal infection called lupus vulgaris results; if it enters the lymph glands or joints and localizes there an inflamation of not necessarily a fatal character results; if it enters the lungs pulmonary tuberculosis or consumption occurs which usually, after being well established, runs a fatal course; if it enters the intestines, intestinal tuberculosis may result which is nearly always fatal; and if it enters the meninges, tubercular meningitis results which is rapidly fatal. Just so with the *Strept. pyogenes,* depending on whether it enters the circulation, the lymphatic vessels of the skin or the connective tissues there results septicemia, erysipelas, or abscesses which obviously differ in their severity. The same is true of practically all the pathogenic bacteria which invade the plant and animal body, the variation in the route produces a great variation in the type and the results of the infection.

It was mentioned in the beginning of this discussion that *infection* included certain things such as the entrance of bacteria into the body tissues, their increase and their injury to the body. There is some variation in what constitutes an infection depending upon the infectious microörganism and the tissue it attacks. For example, *Msp. comma* of Asiatic cholera does not produce an infection unless it comes in contact with the intestinal mucosa and in this case it does not enter the tissues but sets up an inflammatory process on the surface. If this same bacterium comes in contact with tissues such as those of the nose, throat, lungs, no infection results. In the case of *B. typhosus* of typhoid fever the bacterium not only attacks the intestinal mucosa, but in addition it enters the tissues of the lymphatic patches and sets up an inflammation. This microörganism may also invade the circulatory system directly. In order for such an organism as the *Strep. pneumoniae* to produce pneumonia it is only necessary for the bacteria to come in contact with the thin, single celled, alveolar wall through the blood or air passages. In case this bacterium produces an abscess it is necessary for it to first enter into the tissues. In the pneumonic form of plague the *Bact. pestis* is carried to the alveolus through the circulation and thus enters the tissues of the lung before actually invading the alveoli. This sometimes occurs in case of *Strept. pneumoniae.* It also gives rise to abscesses occasionally but only when it invades lymphatic glands. The same is true of the large number of infectious microbic agents; there is a variation in the infection due to the variation in the microörganism and the point where this agent attacks the body. The severity of an infection, as for example, a pneumonia due to *Strept. pneumoniae* or to *Strept. pyogenes,* or to *Bact. pneumoniae* (Friedlander) or to *Bact. pestis,* would vary with the infectious agent, its virulence and number, and with the resistance of the individual infected.

THE FACTORS WHICH INFLUENCE THE RESULTS OF AN INFECTION.

There are four principal factors which influence the results of an infection. They are as follows: The virulence of the infecting microörganism; the number of the infecting microörganisms; the avenue by which the infectious microörganism enters the body; and the resistance of the plant, animal or individual infected.

Virulence. It is a self-evident fact that the more virulent a microörganism is the more serious will be the infection which results from its invasion of the body. There is a great difference in the virulence. For example, *Strept. pyogenes* may infect the skin of mucous membranes and produce only an abscess of varying proportions. Again, it may be more virulent. The resistance of the infected individual may be lowered somewhat and the streptococcus may enter the lymphatics of the skin and produce erysipelas of the blood stream and produce a fatal septicemia. Furthermore, one strain of the streptococci in the blood may produce a very virulent infection and another a less severe one. Virulent streptococci are not phagocytized by the leucocytes. The same variation in virulence is noted in all the pathogenic bacteria and the infections are modified thereby. The fact that an organism is virulent for an animal is not evidence that it is virulent for man. The virulence of an organism depends upon its ability to form toxins or other poisonous substances.

Number. The number of infecting microörganisms which are introduced into an animal body is of importance. In anthrax, for example, it has been shown that one bacterium is capable of multiplying and setting up an infection. In tuberculosis and typhoid fever and most of the infectious diseases it requires a rather large number before an infection will take place. The leucocytes, bactericidal substances in the blood, and the body cells in general are capable of destroying many infectious agents. Furthermore, it can be readily understood how a few bacteria might be able to cause a mild infection and an increasing number be able to so overcome the bodily resistance as to cause a more or less severe infection.

Avenue. It has been pointed out previously how the avenue of infection modifies the infection. A very virulent microörganism may occasionally produce a very mild infection when introduced in a certain locality while in another place the same organism may produce a very severe type. The results of the infection will be materially modified depending on the avenue of entrance which the virulent microörganism takes. For example, in addition to those mentioned previously, suppose *Bact. pestis,* the causal agent of plague, enters the blood through the skin, or the lymphatics through the tonsils, it is carried to the lungs and there produces a very severe and usually fatal pneumonia; if bacteria enter the lymphatic system in large numbers they frequently localize in the lymph glands producing buboes or glandular enlargements which are always fatal. These bacteria may also enter the blood current and produce a rapidly fatal septicemia. It has not been established in man that plague can be produced by the ingestion of *Bact. pestis,* but in some susceptible animals such as rats, the disease in a very fatal form is rapidly acquired when the bacteria enter the intestines.

Resistance. This factor is one of the prominent ones which modify the results of an infection. It is a familiar fact that two or more individuals may be infected with the same microörganism, as for example, *B. typhosus* and one will not become infected or have a very mild form of the disease, while the other will have the severest and most fatal form of typhoid fever known. Again, the age of the individual infected is important in determining the resistance. The adult resists infection such as diphtheria, scarlet fever, and measles more than the child. The very young child resists pneumonia and tuberculosis more than the adult. The resistance of the body depends on the presence in that body of natural or acquired antibodies. It is therefore obvious that the higher resistance or immunity of the individual infected, the less severe will be the results of the infection on that individual.

THE EXACT CAUSE OF INFECTION.

We are familiar with the fact that all of our infectious diseases are due to microörganisms or viruses of some form or other. The causal agents of many of these diseases are known but in the case of those that are not known there is reasonable certainty as to the types of the infecting agents. The exact substances which are produced by the microörganisms and which are responsible for symptoms of the various diseases will be briefly considered as follows:

Soluble Toxins. It is a known fact that there are some pathogenic bacteria which secrete through their cell walls poisons which diffuse into the surrounding media. To these poisons or toxins the disease symptoms are due. *Bact. diphtheriae* of diphtheria, *B. tetani* of lock-jaw or tetanus, *Bact. dysenteriae* of bacillary dysentery, *B. botilinus* of meat poisoning, and *Ps. pyocyanea,* the causal organism of blue-green pus, are about the only bacteria of this character. Some bacteria, such as *Strept. pyogenes* and *M. pyogenes var. aureus* produce hemolytic toxins. There are certain protozoa as, for example, the *Entamoeba coli* and the various trypanosomes which secrete soluble poisons. Among the animals, the venoms of the poison snakes; the poison of the centipedes and spiders, the serum of the eel, and the excretion of the dermal glands of the toad are examples of secreted toxins (zoötoxins). Again, among the plants are abrin from the jequerity bean, recin from the castor oil bean, and others, are examples of soluble toxins the product of plant cells (phytotoxins). The cells producing these toxic substances, therefore, are only indirectly responsible for the infections for it is the toxins themselves which produce the pathogenic effect on the body.

Endotoxins. Many of the pathogenic bacteria and some of the protozoa do not secrete their toxins outside the cell wall but hold them within the wall in combination with the protoplasm. They do not liberate these substances until the microörganisms die and are disintegrated. Such toxic substances are called *endotoxins* to distinguish them from those secreted from the cell, namely, the *soluble toxins.* Two of the best examples of pathogenic bacteria of this type are the *Msp. comma* of Asiatic cholera and *B. typhosus* of typhoid fever.

Toxic Bacterial Proteins. There are some bacteria and other parasitic cells which produce a small amount of endotoxin and in certain instances some soluble toxin but not enough of either of these substances to account for the toxicity of the organism. It has been found that, when organisms of this character are ground up and washed to free them of their endotoxin and are washed free of all soluble toxins, they are still toxic. It has been shown that this toxicity is due to the protein substances of the cell. The *Bact. tuberculosis* and the *Bact. mallei* of glanders are two notable examples of microörganisms of this character. When, for example the proteins of *Bact. tuberculosis* are injected into the circulation of susceptible animals tubercle formation occurs showing that these proteins are poisonous.

Other Possible Exact Causes. In certain infectious diseases it is also claimed by certain writers that enzymes are responsible. This lacks substantiation. It is also stated that in such infections as anthrax that the mechanical effect of the bacteria plugging up the capillaries and producing micotic emboli is a factor. This may be true but in addition other factors are concerned as previously mentioned.

In mixed infections of two or more organisms, which frequently occurs, the infected individual may have within the body soluble toxins, endotoxins, and toxic bacterial proteins and in such a case it is difficult to differentiate their action.

THE METHODS BY WHICH INFECTIOUS MICROÖRGANISMS ARE DISSEMINATED.

The microörganisms of some of the infectious diseases such as diphtheria and Asiatic cholera and usually tetanus remain local and seldom enter the body generally. From the locus of the infection they disseminate their toxic or poisonous products. In the case of tetanus the toxin is carried over the body along the sheaths of the motor nerves; in diphtheria the toxin is usually carried by the lymph, and occasionally by the blood; and in the case of cholera the blood and lymph both serve to carry the toxic agents. In diphtheria and cholera the microörganisms very frequently extend along the mucous membranes from the original point of infection. There are other infections in which the causal microörganisms extend only from the point of original invasion into the surrounding areas. Such is the case with *Strept. pyogenes* in the infection of the lymphatics of the skin in erysipelas and of *Bact. influenzae* in all infection through the respiratory tract. Many of infectious agents are carried by the blood, and occasionally by the lymph, as for example, in tuberculosis, syphilis, glanders, plague, leprosy, pneumonia, and the septicemias due to the pyogenic cocci. It is possible in certain cases that the leucocytes acting as phagocytes may carry virulent infectious agents through the blood and lymph from one part of the body to the other.

THE METHODS BY WHICH INFECTIOUS AGENTS ARE ELIMINATED FROM THE BODY.

The etiologial microörganisms of the various infectious diseases may be eliminated from the body in two general ways, namely, by a direct method and by an indirect method. For a microörganism to be directly eliminated from the body it is necessary for the focus of the infection to communicate with the outside of the body in some way or other. In the case of infections of the mucous membranes and the skin there is, of course, direct communication with the outside. In diseases of the respiratory organs and the intestines the infectious agents are discharged into the lumen of the air passages and the intestines and then thrown out from these passages. Examples of the partial direct elimination from the skin may be found in such disease as smallpox, measles, syphilis, scarlet fever, lupus vulgaris, and in suppurative conditions such as carbuncles and furuncles. From the present evidence little significance is to be attached to the elimination of the infectious agents mentioned directly from the skin. It is probable that the microörganisms which are eliminated remain alive for only a short time and are not factors of consequence in the transmission of these infections. As examples of diseases in which direct elimination from the various mucous membranes occurs infections such as typhoid fever, tuberculosis, cholera and dysentery from the membranes of the intestines; influenza, pneumonia and tuberculosis from the bronchial membranes; diphtheria, leprosy, glanders and scarlet fever from the membranes of the nose, throat, and tonsils; and gonorrhoea, syphilis and tuberculosis from the membranes of the genito-urinary tract, may be mentioned. In the elimination from the various internal membranes sometimes reinfections occur such as in the case of the elimination of *Bact. tuberculosis* from the respiratory tract, the swallowing of the sputum, and the subsequent infection of the intestines.

In the second, or indirect method of elimination, two distinct propositions present themselves; first, the infectious microörganism must enter the lymphatic or blood circulation, and, secondly, in order to get out of the body they must pass through the cells of some of the organs, the mucous membranes or skin. It is a common occurrence for bacteria and other microörganisms to get into the circulation in some of the infectious diseases such as typhoid fever, pneumonia, plague, and in the various septicemias. They may pass through the epithelium of the kidney and be eliminated in the urine; they may pass through the liver and be eliminated in the bile finally passing out through the intestines; and they may pass through the mucous membranes of the intestine and possibly pass through the glandular epithelium of the sebaceous and sweat glands and be eliminated through the skin. They have also been known to pass through the glandular epithelium of the milk glands when these glands are not grossly diseased and through the salivary glands. It has been recently well demonstrated that there must be some form of lesion in the liver and kidney in order for the microörganisms to pass through. Infectious microörganisms are sometimes destroyed by the lysins in the blood, carried to and deposited in the spleen and bone marrow and gradually disintegrated and dissolved.

In certain infections in which a recovery seems to have occurred all the infectious microörganisms are not always eliminated from the body. As mentioned previously, *B. typhosus* and *Bact. diphtheria* are frequently carried by persons fully recovered from these diseases. Sometimes, however, inflammatory infections are set up by these bacteria. It has been suggested on seemingly good evidence that inflammations of the gall bladder and gall stone formation may be due to the toxic action of the bacteria of typhoid fever which have been retained in the gall bladder for a considerable time following an attack of typhoid fever. It is known that frequently repeated attacks of malaria are due to the retention of some of these protozoan parasites for a time in the quiescent stage. Repeated attacks of erysipelas caused by the *Strept. pyogenes* may also be due to the same condition. It is also claimed by some (Von Behring) that *Bact. tuberculosis* is taken into the body in infancy, that it is not eliminated, and that it sets up infection in later life.

In concluson should be mentioned one other indirect way in which infectious agents are eliminated from the body, namely, by being taken up by suctorial insects from the blood. It is necessary that this be done in order to perpetuate the parasite and complete its life cycle in certain instances, as with the mosquitoes in yellow fever and malaria. In other instances the parasites are only taken up by the insect and subsequently injected into another individual or digested as the case may be. This occurs with the ticks in the transmission of certain of the piroplåsmoses and with the tsetse flies in the transmission of certain of the trypanosomiases.

THE EFFECT OF INFECTIOUS MICROÖRGANISMS ON THE BODY.

It becomes necessary to consider briefly the effect of the various infectious microörganisms and their toxic substances on the body.

The Period of Incubation. This period is that elapsing after the entrance of the infecting organism into the body until the symptoms of the disease develop. This period is variable in most diseases and depends upon the same factors which modify the results of an infection, namely, the virulence of the infecting organism, the number growing in the body or its tissues, the avenue, and the resistance of the individual. The period can be in a measure controlled and shortened in experimental animals by inoculation into the circulatory system and in other regions depending on the organisms used. In some of the human diseases, particularly those of unknown cause, the period of incubation is quite constant, as for example, in smallpox and measles.

Local Reactions. The local effects of the toxic substances of microörganisms are usually first inflammatory and later possibly necrotic, that is, they produce a death of the tissue involved. The inflammatory changes may be confined to those of an acute character as, for example, in the various serous, hemorrhagic suppurative and fibrinous inflammations or be chronic and proliferative in nature. There is always a variation in the type of inflammation depending on the location of the infection and also a variation in two different individuals of the same species infected at the same point with the same agent. In some diseases such as tetanus the local point of infection may entirely heal and still the bacteria be localized at this point and disseminate their toxin. In some cases of tuberculosis and glanders the bacteria may become localized at the points of infection and after an acute inflammatory stage the point may become the seat of a chronic process and proliferative changes occur in the tissues.

GENERAL REACTIONS.

Metabolism. The general metabolism of the body is affected by the changes produced in the amount and the chemical constitution of the food substances which are taken into the body. By changing in the same way the substances which naturally are eliminated from the body and by setting up new and abnormal changes in the functional activity of the tissues, the general metabolism may be disturbed. Muscular weakness, delirium, pain and loss of appetite, together with vomiting, diarrhoea, disturbance of intestinal absorption and the digestive juices are often noted in cases of altered metabolism. The fats, carbohydrates, and then the proteins are in the order named rapidly used up, producing certain changes in the respired air and in the urine and feces. Infectious microörganisms may also reduce the power of the hemoglobin to carry oxygen and perhaps cause a narrowing of the respiratory passages thus preventing the necessary amount of oxygen reaching the lungs and subsequently the tissues.

Infecting microörganisms may alter the composition of the food substances and after being taken into the body produce abnormal compounds which have little or no nutritive value on absorbtion or they may produce toxic substances related to ptomains. Substances which normally should be eliminated from the body are often retained and abnormal losses of such substances, as water and various albuminous compounds, occur.

Attendant upon the changes in metabolism usually there occurs *fever* in all infectious diseases. It is probable that the fever is the result of the effect of the toxic protein compounds of the infecting microörganisms on the tissues, or the disintegration of the protein compounds of the body due to the action of toxins. It is evident that the fever producing substances, in certain infectious diseases, act in a very characteristic manner as is demonstrated by the so-called typical fever curves. It seems to have been demonstrated that fever is a good sign and that it is indicative of the reaction of the body to the toxic substances of the infecting agents. It has also been shown that the fall of fever in certain infections is attendant upon the formation and saturation of the body fluids with antibodies.

Blood-forming Organs. There are usually changes in the blood forming organs in most all types of infection. The spleen frequently shows enlargement and contains numbers of myelocytes which are also found in the blood in increased numbers. This is probably due to the disintegration and deposition there of red blood corpuscles and also to the action of toxic substances. The endothelial cells and leucocytes of the spleen are actively phagocytic. The bone marrow, particularly the fatty marrow shows large numbers of myelocytes of the neutrophile type and it eventually becomes lymphoid in nature in a large number of infections. The lymph glands also frequently show endothelial proliferation.

Parenchymatous Tissues. All sorts of degenerations of the kidneys, heart, liver and some of the other organs frequently occur in infections. Amyloid formation and necrosis of tissue sometimes occurs. Many of the toxins have special affinities for tissues, such as the tetanus toxin for nerve tissue and this produces organic changes. It is possible also that the fever is responsible for a certain portion of the changes in the parenchymatous organs in infections.

Epithelial and Endothelial Tissues. In certain infections, as for example, diphtheria, the epithelial tissues are subject to inflammation; and in other infections, as for example, syphilis, the endothelial tissues of the blood vessels undergo inflammation and sometimes proliferation. The epithelial and endothelial cells are frequently actively phagocytic and large numbers of the infecting microörganisms are taken up and destroyed. Some of the infectious microörganisms produce no effect whatever on these tissues while others produce pronounced destructive changes.

Erythrocytes and Leucocytes. Lytic or dissolving substances for the red blood corpuscles are frequently produced in infections (hemolysins). *Strept. pyogenes, M. pyogenes var. aureus,* and *Ps. pyocyanea* are among the bacteria which produce hemolysins. Anemia is, therefore, not an uncommon finding in many infections. Normal human blood and that of some animals contains an antilysin for the staphylolysin and it is sometimes produced in large amounts. Agglutinating substances for red corpuscles are produced by some pathogenic microörganisms and it is possible that these are the cause of the so-called agglutination thrombi which occur in infections like typhoid fever.

The most marked change seen in the leucocytes in infections is in their rather constant increase in number; in most cases a leucocytosis. In uncomplicated tuberculosis and typhoid fever, in measles and German measles, in malaria, and in dengue, there is no increase in number. In acute inflammations it is the polymorphonuclear leucocytes that undergo an increase. This increase is sometimes preceded by a decrease (leocopenia). The leucocytes act as the principal phagocytes of the body and are attracted (positive chemotaxis) to the bacteria or other microörganisms after they have been sensitized by the opsonins in the body fluids. Besides acting as phagocytes they may, according to Metchnikoff, produce antitoxins and bactericidal substances. It has been suggested that the initial leucopenia in some cases is due to the production of negative chemotactic substances. Some virulent bacteria cannot be phagocytized probably because they produce very strong negative chemotactic substances.

Antibody Formation. One of the general effects of infectious microörganisms in certain infections is the production of antibodies of various kinds. These may be antitoxins as in the case of tetanus and diphtheria, or bactericidal substances as in typhoid fever and cholera, or opsonic substances as in the pyogenic infections. Agglutinins, precipitins, and other bodies are also sometimes produced in conjunction with the other immune substances mentioned.

HOW TO KEEP WELL AND COMFORTABLE DURING THE COLD WEATHER.*

ALVAH H. DOTY, M. D.

As winter approaches it is important to take into consideration the means by which our health may be protected and comfort maintained during the cold weather. Nature is able to go a long way towards securing this result, for the resisting power of a healthy body is very great and capable of dealing with extreme variations of temperature, provided aid is extended in the way of careful attention to personal hygiene, suitable clothing and habitations.

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* Bulletin, American Telephone and Telegraph Co.

A young and healthy person would probably be able to pass through the entire year with but little or no change in the form of dress and still avoid any unpleasant consequences; on the other hand as age increases, and when sickness occurs, or when the rules of health are violated, this wonderful resisting power of the body becomes weakened and unable to properly perform its function; then the loss thus sustained, so far as a lowered temperature is concerned, must be compensated for by additional clothing as well as protection from other sources, otherwise unpleasant or dangerous results may follow.

It is therefore obvious that the greatest safeguard in maintaining health and comfort under the various climatic conditions is the proper care of the body, in the way of good nutritious food, appropriate clothing, exercise, bathing and temperance in all things. The satisfactory results which follow this course are particularly apparent during the cold weather.

It will be of interest to consider briefly the various means by which these results may be accomplished.

While it is true that some articles of diet are greater heat producers than others, it is not necessary in this country that any special change shall be made in the character of our food during the cold season beyond that which is regulated by the supply available during the winter months.

It should be said here in connection with the subject of food that most of us eat far too much — particularly of meat. The excess of food which we consume is not only of no value to us but it overworks the digestive organs which become exhausted in the effort to assimilate it. This becomes no small factor in diminishing the resisting power of the body upon which we so largely depend in the preservation of health. Besides, overfeeding, except as a temporary expedient in disease, is a common cause of organic affections later in life.

Another truth may be stated in connection with this subject, and that is, that breakfast should be the best and most important meal of the day; there is no better evidence of health than a good appetite upon rising in the morning, for the alimentary tract has had a long rest and is in good condition to digest a generous meal. The notion that it is sufficient to take only a little fruit, a roll and some coffee for breakfast, is without reasonable or logical foundation, and there is no time when it is more detrimental to health than during the cold weather, For the body, like an engine, must have a proper amount of good fuel in order to perform its work.

As a means of protection during the cold weather it is important that the skin should be kept in a healthy and active condition; this may be accomplished in a very effective manner by proper bathing and exercise. Various opinions exist as to the form of bath which is most suitable for this purpose; most of these opinions are based on theory or individual preference. The most stimulating and pleasant form of maintaining the function of the skin consists in the daily shower of very warm water, and of short duration, followed *immediately* by a cold shower for the fraction of a minute only, the skin being afterwards briskly rubbed and dried. This bath should be taken upon rising in the morning. By this method the surface of the body having been well warmed, the cold shower produces a pleasurable and stimulating effect with the minimum amount of shock, and a good reaction promptly follows if the person is in reasonably good health. Those who indulge in this form of bath find that the body is kept quite warm and comfortable during the day, and a feeling of well being exists, for the skin under this treatment is better able to perform its function and also act as a protective agent.

A cold tub or shower bath, particularly in the winter, is neither healthful nor desirable. The shock which follows is so pronounced that a prompt reaction does not usually take place even in healthy subjects. Furthermore this form of bath is positively contraindicated in the case of the very young or very old, the feeble, and those having organic affections, for under these conditions the result may be harmful or dangerous. It is true there are those who daily throughout the year take a cold bath of the temperature of the running water and stand the shock of this extreme reduction of temperature with apparent pleasure and benefit. However this proves nothing beyond the fact that the resisting power of some persons is far above the average.

In the future the shower is quite sure to replace the tub for bathing purposes, for the latter has no stimulating qualities, is cumbersome to use and is of value only when the old form of a weekly scrub is employed.

Exercise is of inestimable value in keeping the body in proper tone, and warm and comfortable during the cold weather. For if the general muscular system is kept active, more blood is brought to the surface, where it assists in overcoming the effect of the external cold. Furthermore it goes far to relieve the congestion of the internal organs which usually occurs during the cold weather for the blood supply of the surface is diminished by the low temperature. For instance it is well known that the kidneys are more active in the winter than in the summer since during the former period the amount of blood in these organs is greatly increased and their function correspondingly stimulated. On the other hand it is diminished during the warm season, for the skin is then very active. These organs relieve each other, for their function is similar.

Walking is the most common and most valuable form of exercise. It is largely for this reason that the game of golf has become so exceedingly popular and of such extended benefit to the public. Unfortunately this game is not available for all, but walking is, and every one who is able to do so should walk from three to five miles daily or even more. If this exercise cannot be taken during the day, the evening should be employed for this purpose, for there is but little truth in the belief that the night air is unhealthy. Those who have established the practice of taking daily exercise need not be told the benefits which follow it, particularly those who are confined in offices and are of sedentary habits. At the end of the day's work these persons commonly experience a feeling of fatigue; this is mental rather than physical, and the remedy for it is exercise and not rest.

The selection of clothing for the cold season generally involves a change both in the under and outer garments, and the addition of great coats or wraps for outside exposure. It would be difficult to describe the numerous styles and fabrics which are recommended for underwear, the advantages of the greater number of which are largely theoretical. While the various fashions may be acceptable to some, there is but one material which practically and scientifically has received general approval for winter underwear, and that is wool. This substance offers the best protection against the low temperature, for it is a very poor conductor of heat and cold, and while in this way it helps to retain the body heat it also very effectively aids in preventing the chilling effect of the external temperature upon the surface of the body. Cotton is the least valuable for this purpose, while silk probably occupies a position between wool and cotton. Some wear cotton underclothing throughout the year apparently with comfort, yet this does not prove that it is suitable for general use.

It is not required that undergarments shall be composed entirely of wool, for a mixture of twenty-five per cent. of cotton does not materially affect the protective value of this material, while it renders it more agreeable to the skin, and prevents excessive shrinking during the process of washing — although to a great extent modern methods have overcome this unpleasant result.

Not only the material, but the weight of winter undergarments must be considered. It is the common practice to have but one thickness for winter use, whereas in our climate every one should be supplied with two weights in order to insure comfort, for during the latter season the weather oftentimes becomes quite mild, and continues so for a number of days.

Upon the approach of winter, it is also the custom to substitute heavy outer garments for those of the lighter weights worn during the summer; this is largely a matter of habit and not particularly good or logical. While it is important that woolen undergarments should be worn during the winter since it constitutes a direct protection to the skin and guards against the unpleasant effect of sudden changes of temperature upon the surface of the body, a variation in the weight and material of the outergarments is neither necessary nor desirable, for it is at least responsible for much discomfort.

During the winter, particularly in cities and towns, persons remain within doors not less than twenty out of the twenty-four hours of the day. In appartments, workshops or offices the temperature is often superheated, sometimes reaching 80 or 85 degrees; this is practically summer heat, but without the fresh air which is available during the latter season, for the windows are kept carefully closed and with these unsanitary surroundings a persons who is too heavily clothed is not only rendered uncomfortable but the surface of the body is very apt to become tender and moist. In this condition the skin becomes particularly susceptible to the lowered outside temperature which is often 50 or 60 degrees below that of the interior. There is no doubt that this condition is often directly responsible for the various ailments which so frequently occur during the cold weather. The fact is that during the winter we wear heavy and uncomfortable outer garments in order to be protected for a short time while in the open air, whereas our mode of dress should rather be compatible with the interior and then some form of heavy wrap added when we go outside. Under these conditions there is no reason why the same weight and texture of outer clothing should not be worn throughout the year, except probably the very thinnest material known as "tropical weight" which is used during very hot spells in midsummer. Those who have adopted this modern and reasonable form of dress are fully convinced of the comfort and protection which it affords, particularly within doors.

Protection against the diminished temperature outside should be provided for by the use of heavy coats or wraps upon leaving the interior — the great coat or "ulster" is an example of this form of garment, particularly for very cold weather and for evening use, and is made to cover almost the entire body.

It is also very important that special protection should be provided for the feet during cold and wet weather, for the footwear of the present day, particularly that worn by women, offers but little aid in this direction. Carelessness in this way constitutes the most common cause of colds, sore throats and other conditions which are not only uncomfortable but often prove dangerous. Waterproof shoes or boots exist chiefly in the imagination and offer little or no protection. Everyone should be provided with rubbers and overshoes and use them whenever the streets are damp or wet or covered with snow. Unfortunately this valuable form of protection is not popular in this country. Besides complaint is often made that they sweat the feet; this is largely imaginative, for rubbers do not interfere with a person's comfort if they are promptly removed upon entering the house and not kept on for some time afterwards, which is a common practice. Proper protection of the feet and care to prevent the overheating of apartments during the winter months is far more important than the public realize.

The intent of this article is not only to instruct but to warn the reader against the many fallacious theories concerning the care of the person during the cold season. The protective measures which have been suggested are easily carried out and will go far to prevent uncomfortable conditions as well as the various ailments which are commonly present during the winter.

EDITORIAL SECTION.

Civic Welfare and Social Service.

In Ohio, at the present time, a great amount of energy is being expended in the endeavor to awaken the conscience of the people in the smaller cities to a realization of the fact that they have civic problems as well as the large cities. True the problems are neither as varied in extent nor as complex in nature. But the hope of effective prevention lies in the early recognition of the beginnings of the problems which, having been neglected in the large cities, have led to such disastrous results.

The other night we were in a city of 20,000 in the northern part of the state endeavoring to enlist the interest and support of a group of leading citizens in the formation of an organization to improve sanitary conditions in the city and to combat the devastating effects of sickness in the homes. We were given a polite hearing but met with no burning desire to act upon our proposed program. We discovered that efforts to form organizations to deal with poverty, juvenile crime, playgrounds, the prevention of blindness and the care of destitute children, had been put forth by as many social workers within the month. Each worker had eloquently discoursed about his own particular field of interest and urged its supreme importance. Each had advocated the employment of a trained social worker by the community, either out of funds provided by taxation or voluntarily contributed.

The question was very properly raised, "what will we do with all these organizations"? and "how in the world will we ever finance all these workers?" We answered that one organization would suffice to deal with all of the problems suggested and that one worker would be able to do the necessary work in the beginning at least.

Practically every small city in Ohio has its number, large or small, of dependents, defectives, and delinquents, and those who would direct the attention of the communtiy to the meaning and social significance of such conditions are doing a great work of prevention.

The rapid development within the past fifteen years of varied forms of social service work in the larger cities is as bewildering as it is astounding. The formation of voluntary national organizations dealing with special problems has gone on apace and a current list of such organizations presents a formidable array.

That such national organizations meet a real need is not to be doubted. That there is need for a division of labor in the larger cities to meet the many problems confronting the communities cannot be questioned. That these problems are interrelated is admitted and recognized by all social workers. An effort to formulate a definite program of community action is seen in the organization of councils of social agencies, central philanthropic councils and federations of philanthropy, where representatives from the various organizations meet to discuss questions of policy and procedure in dealing with problems that present themselves for solution.

Such a course of development in the large cities was inevitable because the tangled skein was unravelled but slowly and the problems came to light one by one. The elements of the social problem may now be said to be clearly envisaged. The pioneer days are over. The task now is to build a program which may enlist every resource of a community in dealing effectively with the separate manifestations of social and civic disorder, both in respect to the end-products and the prevention of future end-products.

What is to be the development in the small cities of 5,000 to 50,000 population? Do the social workers of Ohio engaged in the extension work in the smaller cities intend to duplicate the inevitable but none the less expensive and wasteful development in the large cities?

Or do they plan to meet upon a common ground to discuss how the organization of these communities can best be effected to conserve energy and money and at the same time to deal with the problems which we are all anxious to see properly handled?

It appears to us that those who are responsible for the direction of state work will defeat their own ends if some intelligent program for united action is not adopted before it is too late. There is danger of the social workers following in the footsteps of the medical profession and becoming split up into various schools or factions with the result that their plans will make but halting progress from year to year and work a permanent injury to the communities themselves.

* * *

Publicity as a Factor in Public Health Work.

The value of publicity as a factor in public health work is not fully appreciated by the average health official. As a consequence, the work of the health department is ignored by the people unless there is special need for its services. The legislature, the council, or other bodies who control the public purse, finding no public sentiment in favor of an adequate appropriation for public health protection are inclined to make the budget follow the lines of least resistance, and allow the health department sums quite insufficient for constructive work.

Nor does the lack of proper publicity militate only against a sufficient appropriation. The public, not being informed in the theories of public health work, is inclined to lay stress upon features of the work which are of small moment and blame the health department for a lack of efficiency because some of the precautions based on outworn theories have been dispensed with. Further, when an epidemic is raging and the co-operation of the public is desired, such co-operation cannot be readily gained. Neither is it so intelligent as when based upon a definite knowledge of the factors concerned in the transmission of disease gained from a well-organized campaign of publicity which has utilized the public press and department bulletins.

Because of the fact that physicians have played a large part in public health work the publicity campaign has gained momentum slowly. This is largely due to the natural and healthy aversion of the ethical physician to advertising of any kind. Physicians do not desire to be linked in any way with those outlaw members of the profession, who by advertising special cures and special ability play upon the credulity of their victims for financial gain. A physician, who is a public health official, must recognize the great difference between the ethical campaign of public health publicity and the vicious advertising of the quack.

Any health department which does not utilize to a full extent the advantages offered by the press sheet, the daily newspaper and the health department bulletin is bound to be greatly handicapped. The motives and actions of its officials will be misunderstood, a full measure of the public's co-operation will not be gained, and the criticism and lack of uniformity resulting will negative to a large extent the usefulness of such a department. The public and press desire to know the truth concerning the advances in public hygiene and it is certainly the duty of those servants of the public who devote their time to this field of endeavor to satisfy these quite legitimate desires.

* * *

Present Status of the Occupational Disease Question.

(1) Deaths from occupational diseases are *rare*.

(2) Specific occupational diseases, as for instance, those due to poisons, are *fairly common*, taking all classes of workers into consideration, and *very common* in certain industries and trade processes.

(3) Non-specific occupational diseases, such as bronchitis, arterial disease, kidney disease, musculo-osseous affections, nervous and lung affections, are *very common*.

(4) Health complaints in which the occupation enters as a chief factor, either because of environmental conditions or methods of procedure, are *almost universal* in connection with all industries and trade processes.

(5) A certain percentage of these health complaints eventuate into definite diseases, but the extent to which this is so is difficult of ascertainment, and is also beside the point.

(6) It would appear that up to the present most legislative measures have been aimed at those which cause death, or those which are specific, with the result that but a very small part of the field has been covered. Such has usually been well covered, but methods and industries change so rapidly that it can be seen that such methods of regulation can never fulfill the ends desired.

(7) It would appear that the most feasible solution is to attack the more general, although apparently trivial complaints. These can usually be shown to be due to some one or more of ten common health-hazards, such as devitalizing air, improper light, dust, humidity extremes, temperature extremes and variations, application extremes (fatigue or inactivity), infections and transmissible diseases, poisons of various kinds and forms, electrical influences, air pressure variations, industrial inducement to stimulantism, and finally, to the fact that the individual is above or below the average physiological normal which is expected for the occupation or trade process in which he is engaged. (This latter hazard is dependent largely upon heredity, congenity, early development, moral hazards, housing and dietetic hazards, as well as the exact industrial application).

The best method of attack appears to be that of placing broad and discretionary powers in the hands of a competent board to formulate orders, rules and regulations. The board should depend largely upon the evidence of health-hazards submitted, and the opinions of persons properly qualified.

The problem, further, appears to be that of accepting the standards which have so far been adduced in regard to each of these hazards and demanding that these standards be approached as nearly as possible wherever these hazards are found to exist in connection with industry or workers.

(8) Legislation is apparently on foot for the compensation of occupational diseases, especially in all states where it has already been adopted for industrial accidents.

(9) Sickness insurance for all classes of workers, and for all forms of disease appears to be an assured fact in the leading states within the next five to ten years.

(10) A vital point would appear to be organizations for the direct instruction of workers in personal as well as industrial hygiene. This probably can be carried out best by direct instructions at the workplaces, by placards, short talks, foremen's instruction and co-operation — all under the supervision of a physician-sanitarian arrangement. Ancillary to this are physical examinations, health registers, selection of workers, and enough wages to conserve the physiologic state of all workers.

(11) Many intensive investigations must yet be made, using as a guide industrial health complaints.

(12) All institutions for the cure, alleviation, treatment, and dependency must be required to make a careful inquiry of all inmates and applicants into industrial health complaints, and must arrange for the same in their filing systems, so that they may become available to corrective agencies, which may seek their cause and eradication. This is all aimed at the now too prevalent custom of accepting these "remnants" of industrial hazards as a matter of course.

* * *

Tuberculosis and Industry — A Solution for Ohio.

"How can you say that tuberculosis may be due to occupation?" This question is the first one which enters the mind of the person who hears the term "industrial tuberculosis". It is answerable as follows:

"Industrial tuberculosis" must not include persons suffering with the disease who have not *worked* subject to well known health-hazards which would predispose to the disease. It has been shown that for all adults a little tuberculosis is the almost universal rule. There is needed but the presence of health-hazards to depress vitality to activate the disease. These hazards are potent whether in relation to industry or not. But where they are present as industrial factors, just to that extent is the active tuberculosis to be considered industrial.

True cases of industrial tuberculosis must show a minimum of all hazards outside of industry. (Instances which come within this definition are the most typical cases of industrial tuberculosis).

All cases of active tuberculosis which are allowed to continue in industry subject to any hazards which favor the promotion of the disease are, of course, industrial to that extent.

All persons with active tuberculosis who continue to keep occupied in spite of gradual failing of health must be considered as promoting industrial tuberculosis within themselves, and (if they work in proximity to other persons who are subject to industrial health-hazards) as "carriers" in the spread of the disease among fellow-workers.

All employers who hire persons with active tuberculosis must be considered as agents in the spread of the disease. In the same manner all social conditions which impel the victim of tuberculosis to seek occupation, or remain at occupation, are promoting industrial tuberculosis.

Tuberculosis is never directly occupational except in isolated instances; as, through the common handling or mouthing of infected objects (nurses, physicians, laundresses, butchers, tanners, glass-blowers, etc.). Dust, recently contaminated with the *bacillus tuberculosis,* and droplets of moisture (coughing, sneezing, condensed steam particles, etc.) may be the inanimate carriers in the direct spread of the disease from one person to another. The broader viewpoint, however, must insist that the term is intended to associate the tuberculous workers with those hazards of industry which are known to promote or reactivate the disease (darkness, humidity extremes, vitiated atmosphere, temperature extremes, fatigue extremes and poisons).

"How are you going to compensate for industrial tuberculosis?" Without doubt this is a significant and weighty question. There appears to be the following solution: Tuberculosis sickness insurance for all workers, the rates to be based upon the prevalence of the disease in each industry according to the best obtainable information. As with accident insurance, tentative rates will have to be established for a time. If tuberculosis or pre-tuberculous affections are the principal causes of disability in a given industry, rates will be correspondingly higher for that industry. It is needless at this place to go into the details of any scheme for industrial sickness insurance for there are plenty of guides and precedents available in foreign experience. It is sufficient to point out that as soon as adopted (if according to the usual methods) the eyes of employers, employes and the state will be fixed upon the "high rate" tuberculosis industries and since each is stimulated from the dollar side, industrial tuberculosis will rapidly come under automatic control.

* * *

Tuberculosis.

In this issue of the JOURNAL we publish an original article entitled, "What I learned About Tuberculosis," which, as the title indicates, is written from a real personal experience with the disease.

We wish to commend it to our readers because the author is a native of Ohio, and is an accurate observer and recorder. He served for a number of years as editor of the official publication of the American Chemical Association, "Chemical Abstracts," has had an excellent education and is not given to over-statements in his writings. The note of hope which he sounds should have its weight with those who are suffering from tuberculosis in its initial stages.

* * *

Disinfection of Water by the Ultra Violet Ray.

Much interest has been aroused by the development of a method of disinfection of water by the ultra violet ray. This method is now used in the treatment of the public water supplies of several large European cities but has not as yet been adopted extensively in this country.

At present sufficient data are not available to prove the efficiency of the process and its practicability from the economic standpoint. At Corning, New York, an installation is in progress and it is to be expected that valuable information will be secured from the operation of this plant. Extensive tests are also to be made at Montreal where the effluent of a rapid sand filter plant is to be treated experimentally. The Ohio State Board of Health will also, in the near future, undertake a study of the efficiency of the ultra violet ray in the disinfection of water. As a result of investigations under way and in contemplation, it is probable that the merits of the process will be ascertained.

* * *

Annual Reports.

The duty and responsibility for a public annual accounting is a cardinal maxim for officers of voluntary organizations supported by funds contributed by the public. This issuance of annual reports, covering the work performed during the preceding year, together with a financial statement properly audited by public accountants, has usually taken the form of a booklet. These are sometimes profusely illustrated and in most cases much non-essential matter is contained in them. They prove an expense to the organization far out of proportion to their real value. Recently we have noticed a tendency to restrict these reports to the absolutely essential facts concerning the organization which will give to the uninformed individual who may wish to learn about its activities a clear cut impression. Such a report is that issued by the Visiting Nurse Association of Cleveland and we commend it to those who have occasion to issue reports.

JANUARY MEETING OF THE STATE BOARD OF HEALTH.

The regular monthly meeting of the State Board of Health was held in Columbus, January 27, 1915.

The mayor and clerk of the village of Bryan appeared in reference to complaints that sewage from that village had created a nuisance in Joe and Lynn Runs. The representatives of the village admitted the pollution of these streams and stated that the only excuse the village could offer was that the village was not in such financial condition as to warrant the expense of installing a sewage treatment plant. The discussion brought out the fact that the present financial condition of the village is due to construction of a number of miles of paved streets. After consideration of the complaint, statements and other evidence presented, the Board adopted an order requiring the village of Bryan to install and have in operation the necessary sewers and a sewage treatment plant to correct the pollution of Joe Run and Lynn Run within eighteen months from the date upon which the order is signed by the Governor and Attorney-General.

In response to a citation to the city of Cleveland in reference to complaints of the pollution of Lake Erie by the sewage from that city there appeared for the city the consulting engineer who presented a letter from the mayor acknowledging the justness of the complaint and stating that the city is willing to carry out any reasonable improvement the State Board of Health might order made. The Board adopted an order requiring the city of Cleveland to install and have in operation within three years from the date upon which the order is signed by the Governor and Attorney-General such works and means as may be necessary to correct, in a manner satisfactory to the State Board of Health, the pollution of Lake Erie caused by sewage and other wastes discharged into the lake by the city of Cleveland.

A resolution of the village council of Plymouth was presented requesting approval of plans for the public water supply to be taken from the quarry pond. The consulting engineer and a member of council were present to represent the village. After due consideration of the statements of these representatives, the reports of the investigation by the Division of Engineering and other evidence, the Board voted to disapprove these plans and to advise the village officials that water from the proposed source in its raw state is of unsatisfactory sanitary quality.

Representatives of the villages of Maumee and Perrysburg were present to request an extension of time within which to install a sewer system and sewage treatment plant. This matter was referred to the Division of Engineering for investigation and report.

The Secretary presented a statement relative to the water supply of East Liverpool and called attention to the fact that the date for compliance with the Board's order requiring the installation of a water purification plant had expired and that there had been no compliance with the order. The Secretary was instructed to bring the matter to the attention of the Attorney General.

Representatives of the Smith system of natural filtration were present and discussed the merits of this system of securing a water supply.

Plans were approved for a proposed sewage treatment plant at the new school building at Hebron. The Board of education is required to provide for the proper operation and maintenance of the plant and it is also provided that the plant shall be abandoned and removed whenever sanitary sewers and sewage treatment plant shall be installed by the village.

The Board disapproved plans for a proposed water supply for the Shaker Farm belonging to the Dayton State Hospital for the reason that the source of supply in its present condition is liable to contamination. The State Board of Administration is advised that by proper development and protection a satisfactory supply from this source might be developed but the matter should be carefully investigated.

Plans for a water supply for the District Tuberculosis Hospital at Springfield Lake were approved subject to the condition that detail plans showing the method of development of this supply shall be submitted to the State Board of Health prior to July 1, 1915.

The Board approved plans for the proposed enlargement of the public water supply of Fostoria comprising the construction of a storage reservoir. The Board voted to withhold approval of the supplementary water supply to be obtained from an abandoned quarry pit located in the valley of Portage Creek immediately north of the city and will require that this supply be abandoned as soon as the proposed new reservoir has been completed and placed in service.

The Board approved plans for an additional water supply for the city of Mansfield to be obtained from wells. Owing to the poor location of these wells the condition is attached requiring the renewal of the approval by January 1, 1918. The city of Mansfield is advised that this supplementary supply cannot be considered as a permanent solution of the problem of a future water supply for the city and that a thorough and extensive water supply investigation should be made by a competent engineer with the view of securing for the city a permanently adequate supply of water of satisfactory quality.

Plans for a water supply for the village of New Boston were approved. This supply is to be obtained by connection to the water distribution system of the city of Portsmouth.

The Board approved general plans for the improvement of the water purification plant at Upper Sandusky. The water company is advised that existing water purification plant is unsatisfactorily located and that proper measures should be taken at once to secure a new location and to construct a plant of modern design.

The Board approved plans for a proposed water supply for the village of Westerville to be derived from deep wells. The village council is required to pass an ordinance prohibiting the establishment of any leaching privy vault, cesspool or other source of pollution within 1,000 feet of any of the public supply wells and to see that all dwellings within that distance be connected to a sanitary sewer where accessible. The Board approved detail plans for contracts 1 and 3 of the intercepting sewer for the Mill Creek District in Cincinnati. The general plans for this improvement were approved some time ago.

Plans for proposed sewerage and sewage treatment plant were approved for Chicago Junction. The village council is required to enact and enforce an ordinance regulating the proper use of sanitary, combined, and storm water sewers and to see that a competent person is appointed as superintendent of sewers.

General plans for proposed sewage treatment plant for Cleveland were approved. This plant is to be located south of Cleveland on the Cuyahoga River. Detail plans and specifications are to be submitted for approval by September 1, 1915.

The Board approved plans for additional sewerage for the city of Defiance. The city is required to have made a complete survey of the existing sewer system of Defiance and to have plans developed for the collection of the sewage to a point or points for treatment and to submit such plans to the State Board of Health prior to January 1, 1916. The city is also advised that while the sewage from the city is not causing a nuisance at the present time that the use of the Maumee River as a source of public water supply renders it likely that the future treatment of the sewage will be necessary. It is for this reason that the sewer survey is required.

The Board approved plans for a proposed system of sanitary sewers and for a sewage treatment plant for the village of Kent. The village council is required to pass an ordinance regulating the proper use of sanitary and storm water sewers and to provide for the issuance of permits for connections. It is also required that a competent person be appointed as superintendent of sewers and of the sewage treatment plant.

Plans for proposed sewerage for Miamisburg were approved on condition that the council provide regulations for the use of the sewers.

Plans were approved for a proposed storm sewer for District No. 42 in the city of Toledo upon condition that no connections to the proposed sewer shall be permitted whereby sewage or other objectionable waste may reach the sewer.

The Board approved plans for sewerage improvements for the city of Delphos. These plans provide for a method of disposal of the sewage of the city by dilution with water from Grand Reservoir. In the event of failure of the proposed method of disposal to prevent the pollution of Jennings Creek a sewage treatment plant must be installed as required by an order of the State Board of Health under date of March 27, 1914. The city council is required to see that all connections discharging sewage into storm water sewers are removed and new connections installed so as to convey all the sewage to the proposed outlet.

Plans were approved for proposed sewerage and sewage treatment plant for the Wyandot County Infirmary. Samples of filtering material are to be submitted for approval before the material is placed in the filters. The attention of the authorities of the institution is called to the necessity of providing for the proper care and maintenance of the proposed improvement especially as regards the misuse of the sewers by allowing surface drainage to be admitted.

After consideration of the report by the Division of Sanitary Engineering, the Board voted to cite the Belle Vernon-Mapes Dairy Company of Novelty, Geauga County, to appear at the February meeting to show cause why the company should not be required to cease the pollution of a tributary of the Chagrin River which receives wastes from the plant.

Orders and regulations adopted by the village of Bay, Cuyahoga County, were approved by the Board.

Licenses to conduct maternity boarding houses and lying-in hospitals were issued to the Protestant Home for Friendless and Foundlings, 433 West Court Street, Cincinnati; St. Joseph's Maternity Hospital and Infant Asylum, Tennessee Avenue and Reading Road, Cincinnati; Hope Cottage, God's Bible Society, 1817 Young Street, Cincinnati; The Salvation Army Home, 5905 Kinsman Road, Cleveland; Mrs. Ella Thornton, 346 South Wheatland Avenue, Columbus; Mrs. Lila Johnson, 1916 Sixth Street, Portsmouth; Mrs. Mattie McCoy Hullinger, 723 Albert Street, Lima; Miss Lissa Thompson, 388 Glenaven Avenue, Youngstown.

Upon the recommendation of a special committee E. F. McSherry, M. D., of Brookville, Ohio, was appointed as director of the Division of Hygienic Laboratories, Dr. McSherry having been certified by the State Civil Service Commission.

The next meeting of the Board will be held in Columbus, February 25, 1915.

PUBLIC HEALTH ACTIVITIES IN OHIO.

Public Health Exhibit.

Definite arrangements have been made for the Ohio State Public Health Exhibit to visit Findlay, February 9th-12th; Ada, February 16th-18th; Napoleon, February 23rd-26th; Wauseon, March 2nd-5th; Bryan, March 9th-12th.

Conferences, under the direction of James E. Bauman, Esq., Assistant Secretary of the State Board of Health, of county health officials will be held in connection with the exhibit at Findlay, Napoleon, Wauseon and Bryan.

Organizations.

The Social Service League of Xenia was organized on January 19th with the following officers: president, Rev. Huber Ferguson; vice-presidents, Mr. Herbert Davis, Mrs. J. B. Carruthers, J. W. Prugh, Mrs. C. C. Shearer, Mr. George Sampson; secretary, Miss Irma Finley; treasurer, T. C. Long.

On the same date, the Public Health League of Salem was organized. Its officers are: president, L. B. French; secretary, R. W. Hawley; treasurer, Mrs. H. A. Walton.

The Public Health League of Bucyrus was organized on January 29th and the following officers were elected: president, Prof. W. N. Beetham; vice-president, Dr. A. H. McCrory; secretary, Judge Amos Keller; treasurer, Mr. M. R. Lewis.

Public Health Nurses.

Permanent public health nurses have been employed as follows: January 11, Miss Helen Hayden, Mansfield Public Health Nursing Society; January 12, Miss Bertha Billiani, Jackson Public Health League; February 1, Miss Anna L. Sutton, Washington C. H. Welfare Organization; February 8, Miss L. May Bushey, Fostoria Public Health League.

Miss Gertrude R. Steckel was employed on January 19th by the Ohio Society for the Prevention of Tuberculosis to assist in the work of visiting the remaining cities in the list of the 1913 seal competition. She is now in Xenia and will go to Bellevue on February 18th. Miss

Elizabeth Davison has finished her month's work in Bucyrus and took up her work in St. Marys on February 5th.

Tuberculosis Hospitals.

The Second Conference of Ohio Tuberculosis Hospital Superintendents was held at the Ohio State Sanatorium, Mt. Vernon, Ohio, on Friday, January 29, 1915. Every hospital, with one exception, in the state was represented at the meeting. The Committee on Standard Records, appointed at the first conference, reported progress. A Committee on Standard Rules and Regulations was appointed to draw up rules and regulations for the government of tuberculosis hospitals in Ohio. After approval by the Conference, the rules and regulations will be submitted to the Ohio State Board of Health for approval and adoption. A resolution was adopted relating to an increase in the capacity of the Ohio State Sanatorium. The resolution is to be sent to the Governor and the Ohio Board of Administration.

A meeting of the County Commissioners from District No. 10, comprising Pickaway, Fayette, Ross, Pike and Scioto Counties was held February 11th in Chillicothe to discuss the question of forming a Joint Board to erect and maintain a district hospital under the provisions of the law as enacted in 1913.

Conference of Municipal Health Authorities.

The forty-first conference of the State Board of Health with local health authorities was held in Columbus, January 28th and 29th. This conference was planned for health authorities from the municipalities of the state comprising 80 cities and 39 villages with a population exceeding three thousand. Certificates of attendance show that seventy municipal health departments were represented at the meetings. Of this number fifty-eight or over seventy-two per cent. were city departments of health, the remaining twelve departments represented, making slightly less than thirty per cent. of the total number of village departments required under provisions of Sections 1245 and 1246 of the General Code to send delegates. Certificates fail to show the presence of delegates from the boards of health of the twenty-two cities here listed.

City Boards of Health not officially represented at the Conference:

Bellaire, Bowling Green, Canal Dover, Circleville, Defiance, Delaware, Fostoria, Ironton, Jackson, Kenton, Lakewood, Lancaster, Martins Ferry, Mt. Vernon, New Philadelphia, Norwood, Painesville, St. Bernard, St. Marys, Troy, Van Wert, Wooster.

The health departments of the following twenty-seven villages had no certified delegate in attendance at the conference:

Bridgeport, Bryan, Byesville, Celina, Crestline, East Youngstown, Eaton, Elmwood Place, Girard, Greenfield, Hillsboro, Kent, Lisbon, Lockland, Logan, Marysville, Middleport, Mingo Junction, Napoleon, Orrville, Pomeroy, Port Clinton, Struthers, Uhrichsville, Wadsworth, West Park, Wilmington.

It will be seen that practically all of the more efficient and active health departments of the municipalities in the state of over three thousand population, and particularly of all the larger cities, were represented. It seems unexplainable that municipalities within so short a distance of Columbus as Circleville, Delaware, Lancaster, and Marysville failed to have regular delegates in attendance.

Not including members of the State Board of Health, members of the official staff of the Board and the several representatives of the Columbus Department of Health who took advantage of the conference being held in the city, there was a total of ninety-eight accredited public health officials in regular attendance upon the sessions. From twenty-eight city health departments, the Columbus department excluded for reasons above explained, there were two representatives present, the health officer and in most instances, a member of the board of health. No village department had more than one representative.

The health officers of all of the seventy municipalities represented were in attendance with the exception of the officers of Akron, Athens, Cambridge, Conneaut, Cuyahoga Falls, Oberlin, Warren, Wellston and Wellsville. Sanitary policemen from Conneaut, Warren and Wellsville were delegates from their respective cities. Sixty per cent. of all delegates present were physicians. Fourteen of the sixty-one health officers in attendance were not physicians.

The program was as follows:

FIRST SESSION.

JANUARY 28, 2 P. M.

1. Chairman's Address —
   H. T. Sutton, M. D., President State Board of Health.
2. Address —
   Hon. Frank B. Willis, Governor of Ohio.
3. The Problem of Infant Mortality in Cities —
   Frank G. Boudreau, M. D., C. M., Director, Division of Communicable Diseases.
   Discussion opened by C. E. Ford, M. D., Commissioner of Health, Cleveland.

4. The Health Department under the Commission-Manager form of Municipal Government.
   J. R. McDowell, M. D., Director of Public Health, Springfield.
   Discussion opened by A. L. Light, M. D., Health Officer, Dayton.
5. The Danger of Polluting a Public Water Supply by Industrial Connections—
   L. H. Van Buskirk, B. S., Assistant Engineer, Division of Sanitary Engineering.
   Discussion opened by W. H. Dittoe, Cer. Eng., Director, Division of Sanitary Engineering.
6. The Contemplated Work of the Ohio Public Health Federation —
   E. F. McCampbell, Ph. D., M. D., Secretary and Executive Officer, Ohio State Board of Health.

SECOND SESSION.

JANUARY 28, 8 P. M.

1. The Tuberculosis Problem —
   J. H. Landis, M. D., Health Officer, Cincinnati.
   Discussion opened by Robert G. Paterson, Ph. D., Director, Division of Public Health Education and Tuberculosis.
2. The Economic Loss to the Community from Preventable Diseases —
   A. L. Light, M. D., Health Officer, Dayton.
   Discussion opened by T. Clarke Miller, M. D., Health officer, Massillon.
3. Constructive Public Health Legislation —
   E. F. McCampbell, Ph. D., M. D., Secretary and Executive Officer, Ohio State Board of Health.
   Discussion opened by H. C. Brown, D. D. S., Member State Board of Health.
4. The Result of the Ohio Survey of Industrial Hygiene and Occupational Diseases —
   E. R. Hayhurst, M. D., Director, Division of Occupational Diseases.
   Discussion opened by H. E. Welch, M. D., Health Officer, Youngstown.
5. Practical Food Inspection —
   R. J. Carver, D. V. M., Chief Food Inspector, Columbus.
   Discussion by Louis Kahn, M. D., Health Officer, Columbus.

THIRD SESSION.

JANUARY 29, 9 A. M.

1. Lessons from a Smallpox Epidemic —
   Charles A. LaMont, M. D., Health Officer, Canton.
   Discussion opened by Henry Graefe, Jr., M. D., Health Officer, Sandusky.
2. The Limitations of Prevention of Communicable Diseases —
   Martin Friedrich, M. D., Chief, Bureau of Communicable Diseases, Division of Health, Cleveland.
   Discussion opened by W. L. Dick, M. D., Chief Medical Inspector, Columbus.

3. Public Health Nursing in Ohio —
   Helena R. Stewart, R. N., Supervising Public Health Nurse, Division of Public Health Education and Tuberculosis.
   Discussion opened by A. L. Smedley, M. D., Health Officer, Hamilton.
4. Plumbing and Its Relation to Health —
   Wm. C. Groeniger, Director, Division of Plumbing Inspection.
   Discussion opened by G. D. Lummis, M. D., Health Officer, Middletown.
5. Certain Foods and Their Relation to Disease —
   Martha Koehne, M. A., Chemist, Division of Hygienic Laboratories.
   Discussion opened by R. H. Grube, M. D., Member State Board of Health.

Question Box.

Tuberculosis Cures.

J. H. Trahms, of Cincinnati, was prosecuted by the State Medical Board for practicing medicine without a certificate from the State Medical Board, pleaded guilty, and was fined $25.00 and costs. He was soliciting business from consumptives holding out to them that he had a cure for the disease. He was in the habit of sending those whom he solicited to two physicians in that city for the purpose of having the diagnosis made. After the diagnosis was made, Trahms furnished the medicine for the cure which he usually agreed to effect within ten weeks. The patients were asked $50.00 for treatment, and this Trahms collected in weekly installments, when a new supply of medicine was furnished. An analysis of the medicine used by Trahms showed that it consisted of a mixture of potassium iodid and salicylate of sodium.

Dayton Campaign Against Tuberculosis.

At a meeting held in Dayton, February 3rd, representatives of the Anti-Tuberculosis Society, County Medical Society, City Division of Health and the Miami Valley Dental Association, made plans for combating tuberculosis. Some of the principal ideas advocated were closer co-operation of the physicians with the board of health; a strict quarantine of advanced cases of tuberculosis; the dangers of intemperate use of alcoholic drinks; of kissing on the mouth; the use of clean and wholesome milk; dangers of fake cures; and physicians should report immediately any case discovered to the board of health whose duty it should be to investigate thoroughly to see that the patient had proper attention.

A resolution was adopted to be sent to the Joint Board of Commissioners in charge of the District Tuberculosis Hospital, maintained by the counties of Montgomery and Preble, urging that immediate action be taken to remedy the overcrowded condition and inadequate facilities of the hospital.

Health Boards and the Taxpayer.

Appropriations for health purposes in many communities have in the past been granted reluctantly, and in most instances in insufficient amounts for effective work. It has been difficult to convince the taxpayer and the public official that there would be an adequate return for money expended.

Health to them has seemed an individual matter, and health boards have been compelled to beg for every dollar. An improvement, however, is taking place, and the amount per capita of health appropriations is increasing. A more intelligent understanding of the objects of public health expenditures and of the returns to be had is developing.

In some instances, the taxpayer is now on the other side of the proposition. He demands of the health board, having approved liberal appropriations, that it prevent epidemics which endanger the health and lives of himself, his family and his friends. — *Chronicle,* Warren, O., Feb. 3, 1915.

Why Healthy Communities are Nearly Always Prosperous.

Public health is, economically, one of the most important things with which a community has to deal. Healthy communities are nearly always prosperous communities. One of the first questions a prospective land buyer asks is — "Is the climate healthy?"

By this he means will his health be such that he can reasonably anticipate minimum disablement from attending to his work, and therefore, minimum financial and economic loss from lost time.

He means will his family enjoy the maximum of good health, thus saving cost of medicine, doctor's bills and loss of time and suffering.

Health concerns the community as a whole, it is one common ground upon which all may meet; because each man, woman and child when seized with communicable disease puts in jeopardy the health of every other man, woman and child.

Yet, we patronize barber shops which are unsanitary and unclean. We are careless in our milk supply, taking the dairyman's word for it that his surroundings are sanitary. We positively accept dirty street cars where disease breeds rapidly. Even in church we are careless as to the spread of disease.

In simpler terms — wherever human beings congregate in close proximity, undesirable germ life always carried by a percentage of them is apt to spread to others.

The remedy? By making the whole community clean — by setting a proper standard of hygiene and by teaching all to follow it.

But of more importance than the enactment of laws or the promulgation of regulations is their enforcement. It is not the laws on the statute books that are of value, but the ones that are enforced. Every thoughtful citizen should know what work the health department is doing and the extent of protection from disease that is being given to him and to those dear to him.

Such interest will in itself insure more efficient work, for the health department needs the interest of all intelligent citizens. It needs their moral support, their approval of the work accomplished and at times their co-operation. Every household should see that it does not spread disease to others, that it does not become a focus of infection endangering the welfare of the community.—Kenton, O., *Republican,* Jan. 12, 1915.

Caring for Ohio's Blind a Work Well Performed.

The report of the Ohio Commission for the Blind, just made to Governor Cox, is one of the most interesting documents which has been filed with the chief executive of the state. It shows that there is no state department that returns more immediate or steady relief from future taxation, than the prevention of blindness. The report demonstrates the fact that the commission has been working quietly but effectively in its efforts to aid the adult blind and to prevent blindness. One city alone reports that at a conservative estimate, fifty children were saved from blindness of a greater or less degree within the past year. In each case the minimum blindness would have been sufficient to lessen their productive value, and many of the children would have been dependent on either the state or relatives. As these individuals usually live out their full expectancy of life, the vast amount of money saved by not having to educate them as blind children or to support them in later life is appalling as based on this one city alone.

Every section of the state which has witnessed the activity of the commission for the blind can report the same benefit. To educate a blind child at the state school for the blind costs $300 a year more than to educate a seeing child. If the average school life is five years, and it is usually more, it would mean a cost of $1,500 for each child. If the commission saved the vision of only 100 in the state during the past year, or made it possible for this number to go through life in the light instead of the darkness, the saving of the state would be $150,000, to say nothing of the saving of future financial relief by the counties.

The commission has been conducting its sight saving campaign along several lines. First, with the hearty co-operation of the press of the state, by calling the attention of the public to the necessity of securing prompt expert medical care for eye difficulties. Second, by the establishment of "eye nursing service" which has resulted in greater attention being paid to the eyes of infants at birth and also in the obtaining of treatment for adults. Third, by securing the generous assistance of eye specialists throughout the state which is resulting in the formation of a state-wide eye clinic, the first of its kind in America. Time and time again it has been proven beyond doubt that ignorance of the necessity of treatment has cost many persons their vision. In other cases poverty has prevented many who needed treatment from consulting specialists, and thereby saving their sight.

The activities of the state commission have not alone been confined to the saving of sight. Its campaign in the interests of those who are blind has been just as strenuous. The commission favors home work instead of operating a large central institution. For those who cannot be provided with home work, however, endorsement is given to the plan of establishing a series of small workshops in the large cities of the state, such as are now being effectively conducted in Cincinnati and in Cleveland by privately supported societies. Six home teachers, all blind, are in the employ of the commission, and the report shows that during the year they went to the homes of 966 blind individuals in 48 counties and have brightened the lives of many by industrial instruction by teaching a system of embossed reading and by putting them in touch with libraries which supply books for the blind. In 350 cases home workers have been provided with raw material for home employment.

Most of the articles which the blind make in their own homes are sold by agents of the commission in stores where the space for the sale of these things has been given without charge by public spirited merchants. Convincing evidence of the increase in this department of the work is shown by the fact that in 1912 the sale of the blind people's work amounted to $7,000, while in 1914 the sales had risen to $24,000. In marketing these articles generous support has been given by prominent business firms, women's clubs, individuals and the press of the state, all of which come in for a share of the success of the past year along industrial lines.

The problem which confronts the commission is to minimize, as far as possible, the handicap of blindness, and the report further shows that it is not only a question of blindness, but one of assisting those in advancing years. The help given by the state commission is hard to estimate, for besides providing remunerative employment to some of the blind, it occupies their minds, helps drive away the worry that they are a burden to relatives and friends, and at the same time helps to relieve these same relatives and friends of life long anxiety. No person is better able to testify to the work done along this line than the seeing relatives of the blind who are also benefited by the activities of the commission for the blind.

The commissioners again call attention to the fact that they are "in thorough sympathy with the efforts that are being made in Ohio to provide pensions for the needy blind."

The commission has worked in the belief that from a humanitarian as well as an economic point of view it is a wise policy for the state to prevent the tragedy of unnecessary blindness and to prevent the tragedy of unnecessary idleness, and that it has been successful the report shows beyond a question.—Mansfield, O., *News,* Jan. 9, 1915.

Splendid Anti-Tuberculosis Work Among Jews of Cincinnati.

Editor Israelite:

SIR: — I believe the following will be of interest to your local readers and, if you are of like opinion, I should be pleased to have you publish it.

The Jews of Cincinnati are perhaps more liberal contributors to their local charities than the Jews of any city in the United States. The United Jewish Charities has repeatedly and urgently called upon our people to increase their subscriptions and the response has always been most liberal. Yet at times, doubt has been expressed as to the need for such large sums and as to the efficiency with which they were distributed.

It will, I am sure, be both interesting and gratifying to your local readers, to have such unmistakable evidence of the good work of our charity organization, as is found in the study of the tuberculosis death rate in Cincinnati during the year 1914.

In this year the white population of Cincinnati, estimated at 380,000, had 784 deaths from tuberculosis. The Jewish population cannot, of course, be accurately determined, but a fair guess would place it at 25,000. I am confident it will not fall below that figure. On that basis the Jews should show about 52 deaths during 1914. Actually, only 8 Jews died of tuberculosis during the year. Possibly in fairness there should be added three Jews who were sent away from Cincinnati and died in other cities—a total therefore of 11—a death rate of only 20 per cent of the death rate of other whites in the city.

I believe these facts to be a most irrefutable proof that the $20,000 spent annually by the United Jewish Charities for the care of consumptives, and the unexcelled clinic which we run, are accomplishing their ends. As an evidence of what utter neglect can accomplish, let me say that among the negroes, who are not so numerous as Jews, the deaths were 179, or sixteen times the number of Jews.

If the death rate from tuberculosis of all people in Cincinnati were no larger than among the Jews, it would mean a saving of 780 lives a year.

The figures here given are absolutely accurate, taken from the official records of the health department. Yours very truly,

MAX SENIOR.

Cincinnati, January, 1915.

—*American Israelite*, Cincinnati.

Death Rate Falling.

The census bureau has recently published some very encouraging figures showing that the death rate is steadily falling in the registration area of the United States, a pretty fair test of the whole, as it includes 65 per cent of the population.

In 1913 the death rate was 14.1 for each 1,000 of the estimated population, which is a decrease of 13 per cent, or one death in eight, from 16.2, the average from 1901 to 1905. If the same rate had prevailed in 1913 as in the years 1901-1905, there would have been 1,025,446 deaths instead of 890,823, an excess of 134,623.

The death rate was 12.7 in the rural districts and 15 in the cities. —*Observer*, Circleville, O., Jan. 30, 1915.

Anti-Drug Habit League Organizes.

Permanent organization of the National Anti-Drug Habit League was effected January 25. In accordance with the laws of the state a board of trustees was elected and the regulations and by-laws adopted.

The following trustees were elected and will serve for terms of from one to five years: Henry A. Thompson, Judges William D. McKemy and John N. Van Deman, L. W. Crandall and William S. Crandall. Officers will be as follows: Dr. Henry A. Thompson, president; William D. McKemy, vice-president; John N. Van Deman, treasurer, and William S. Crandall, secretary.

Three classes of membership were provided for, active, contributing and life. A prospectus setting forth the objects of the league and the proposed plan of action for the immediate future is being prepared and will soon be ready for distribution. A special meeting will be held in the near future for the formulation and adoption of complete plans for the work of the league.—Dayton, O., *Journal*, Jan. 26, 1915.

May Test Teachers' Health.

Members of the Youngstown board of education are considering the advisability of adopting a plan of physical examination for persons seeking positions as teachers in the Youngstown public schools.

It is asserted teachers of subnormal physical capacity work injury to the school system by being absent frequently from class-rooms. Youngstown has approximately 410 teachers.—Cleveland *Plain Dealer*, Jan. 8, 1915.

Health Week.

A "Health Week" to be given under the auspices of the Cincinnati Physical Education Society is proposed. The idea is to set aside a week during which speakers would address all the public schools, social centers, improvement associations, churches and societies of all kinds on subjects relating to health.—Cincinnati *Enquirer*, Jan. 17, 1915.

Legislation.

Bills of interest to the public health and social worker which have been introduced in the Eighty-first General Assembly of Ohio up to February 15th, are as follows:

SENATE.

S. B. No. 7—Mr. Lloyd, Franklin Co., Jan. 18. Providing for the regulation and licensing of the loaning of money without security or upon personal property.

Jan. 19—Judiciary com.

S. B. No. 9 — Mr. Carson, Muskingum Co., Jan. 18. Relative to changes of water supply for cities and villages.

Jan. 19 — Public Health com.

Feb. 3 — Indefinitely postponed.

S. B. No. 16 — Mr. Archer, Noble Co., Jan. 18. Relative to obtaining marriage licenses.

Jan. 28 — Lost; yeas 13, nays 15.

S. B. No. 23 — Mr. Cass, Putnam Co., Jan. 19. Providing for the appointment of a juvenile and humane officer by common pleas or probate courts of county.

Jan. 20 — Judiciary com.

S. B. No. 29 — Mr. Stone, Lorain Co., Jan. 20. Relating to guardianship and control of inmates of children's homes.

Jan. 21 — Benevolent institutions com.

S. B. No. 54 — Mr. Mooney, Cuyahoga Co., Feb. 1. Providing that applicants for certificates as pharmacist shall have at least two years in approved schools.

Feb. 2 — Medical colleges com.

S. B. No. 55 — Mr. Kennedy, Cuyahoga, Co., Feb. 1. Appropriating $5,000 for extension of state free employment agencies.

Feb. 2 — Finance com. Feb. 4 — Recommended.

S. B. No. 58 — Mr. Mooney, Cuyahoga Co., Feb. 2. Legalizing practice of Christian Science.

Feb. 3 — Public health com.

S. B. No. 60 — Mr. Bauer, Hamilton Co., Feb. 2. Defining delinquent and dependent child.

Feb. 3 — Benevolent institutions com.

S. B. No. 64 — Mr. Behne, Williams Co., Feb. 3. To give State Board of Health supervision of public vaults and mausoleums.

Feb. 4 — Public health com.

HOUSE.

H. B. No. 14 — Mr. Young, Cuyahoga Co., Jan. 19. Relative to the employment of females and regulating their hours of employment.

Jan. 20 — Labor com.

H. B. No. 17 — Mr. Bohm, Cuyahoga Co., Jan. 19. Giving one rest day a week to employes in certain trades.

Jan. 20 — Labor com.

H. B. No. 61 — Mr. Deaton, Miami Co., Jan. 19. Permitting probate court to issue marriage license to persons under legal age who have no guardian.

Jan. 20 — Codes, courts and procedure com. Feb. 1 — Recommended amended. Feb. 3 — Amended. Feb. 3 — Passed; yeas 96, nays 5.

H. B. No. 64 — Mr. Deaton, Miami Co., Jan. 19. To place bureau of vital statistics under state board of health.

Jan. 20 — Public health com.

H. B. No. 94 — Mr. Walsh, Cuyahoga Co., Jan. 19. To provide for admission of feeble-minded youths to state institutions.

Jan. 27 — Passed; yeas 107, nays 0. Feb. 1 — Senate benevolent institutions com. Feb. 2 — Recommended. Feb. 4 — Passed Senate; yeas 26, nays 0.

H. B. No. 98 — Mr. Young, Cuyahoga Co., Jan. 20. To indemnify persons unjustly imprisoned by the state.

Jan. 21 — Benevolent and penal institutions com.

H. B. No. 103 — Mr. Garver, Holmes Co., Jan. 20. Providing payment of fees in prosecutions for bastardy.

Jan. 21 — Judiciary com.

H. B. No. 104 — Mr. Cromley, Knox Co., Jan. 20. To repeal indeterminate sentence law.

Jan. 21 — Codes, courts and procedure com. Feb. 3 — Reported without recommendation.

H. B. No. 121 — Mr. Hoy, Jackson Co., Jan. 21. Authorizing the state board of health to produce free diphtheria antitoxin.

Jan. 25 — Public health com. Jan. 28 — Recommended amended. Feb. 2 — Passed; yeas 106, nays 1. Feb. 3 — Senate public health com.

H. B. No. 132 — Mr. Platt, Ashtabula Co., Jan. 25. To transfer from agricultural commission to state board of pharmacy the power of enforcing regulation of sale of drugs.

Jan. 26 — Agriculture com.

H. B. No. 135 — Mr. Morris, Fairfield Co. Exempting school buildings of one room from provisions of law on fire exits.

Jan. 26 — Common schools com.

H. B. No. 138 — Mr. Jones, Franklin Co., Jan. 25. To provide for prosecution of suit over possession of a child.

Jan. 26 — Judiciary com.

H. B. No. 140 — Mr. Jones, Franklin Co., Jan. 25. To provide for adoption of minor child by an unmarried person or husband and wife.

Jan. 26 — Codes, courts and procedure com.

H. B. No. 142 — Mr. Hoy, Jackson Co., Jan. 25. To bar undesirables from the practice of medicine.

Jan. 26 — Public health com.

H. B. No. 150 — Mr. Black, Wyandot Co., Jan. 25. Transferring control of the woman's reformatory at Marysville from the building commission to the state board of administration.

Jan. 26 — Benevolent and penal institutions com.

H. B. No. 154 — Mr. Morris, Fairfield Co., Jan. 26. Providing new conditions for entrance to Mt. Vernon tuberculosis sanitarium.

Jan. 28 — Public health com.

H. B. No. 156 — Mr. Ott, Hamilton Co., Jan. 26. Providing that street car men shall have 13 hours rest out of every 24 hours.

Jan. 28 — Labor com.

H. B. No. 175 — Mr. Bohm, Cuyahoga Co., Feb. 1. Empowering State Industrial Commission to license all private employment agencies and regulate their activities.

Feb. 3 — Labor com.

H. B. No. 177 — Mr. Terrell, Cuyahoga Co., Feb. 1. To permit Christian Science healers to practice and collect fees.

Feb. 3 — Codes, courts and procedure com.

H. B. No. 190 — Mr. King, Hocking Co., Feb. 1. To legalize agreements between employer and employe and limit injunctions.

Feb. 3 — Labor com.

H. B. No. 203 — Mr. Chapman, Montgomery Co., Feb. 1. Providing county commissioners may maintain comfort stations on county property.

Feb. 3 — County affairs com.

H. B. No. 218 — Mr. Whittacre, Columbiana Co., Feb. 1. Appropriates $5,000 for extending system of free employment agencies.

Feb. 1 — Appropriation com. Feb. 3 — Recommended.

H. B. No. 220 — Mr. Platt, Ashtabula Co., Feb. 3. To authorize and regulate the practice of chiropractic.

H. B. No. 227 — Mr. Hunter, Franklin Co., Feb. 3. To provide for a survey, examination and report upon waterways of the state by special board.

H. B. No. 231 — Mr. Powell, Gallia Co., Feb. 3. Prohibiting the contamination of streams and other water courses and bodies of water by the discharge of wastes from manufacturing, rectifying or other plants.

H. B. No. 244 — Mr. Nieding, Lorain Co., Feb. 3. To create the department of public health and medical registration.

H. B. No. 249 — Mr. Cowan, Putnam Co., Feb. 3. Relating to the admission of persons to state institutions.

H. B. No. 250 — Mr. Oberlin, Stark Co., Feb. 3. Providing for the commitment of inebriates, dipsomaniacs or persons addicted to the habitual use of drugs to hospitals for the insane.

CURRENT COMMENT ON MATTERS OF PUBLIC HEALTH AND SANITATION.

Health Boards and the Taxpayer.

Appropriations for health purposes in many communities have in the past been granted reluctantly, and in most instances in insufficient amounts for effective work. It has been difficult to convince the taxpayer and the public official that there would be an adequate return for money expended. Health to them has seemed an individual matter, and health boards have been compelled to beg for every dollar. An improvement, however, is taking place, and the amount per capita of health appropriations is increasing. A more intelligent understanding of the objects of public health expenditures and of the returns to be had is developing. In some instances, the taxpayer is now on the other side of the proposition. He demands of the health board, having approved liberal appropriations, that it prevent epidemics which endanger the health and lives of himself, his family and his friends. Spartanburg, S. C., has been for several years a center for the study of pellagra by a scientific commission. This has no doubt promoted the study of health matters in general in that community, with the result that the local health service has been well supported, while the people have come to recognize the possibilities of disease prevention. With the idea in mind of the seasonal recurrence of certain infectious diseases, the Spartanburg *Herald* says:

"For the amount of money the citizens of Spartanburg are putting up these days for the public health department they have reason to expect service and results. * * * Just at this season of the year and a little later on, in February and March, most cities are visited by * * * scattering cases of diphtheria and epidemics of measles and whooping-cough. Measles and whooping-cough usually spread until they have exhausted the supply of youngsters who have come on since the last year's epidemic, while diphtheria, because of its more violent character, is usually held in check. But the question in our mind is whether these things have to be. In modern days is there no way to prevent so much suffering and sickness on the part of the little children of a city? The Spartanburg health authorities could in no way carry their services nearer the homes of the people than by making a study of this question and taking every precaution possible to hold these things in check this year."

It goes without saying that the health board of Spartanburg will do its utmost, but this change of attitude of the taxpayer toward disease prevention is interesting and hopeful, says *The Journal of the American Medical Association.* It also emphasizes the obligation on the part of health departments to make good.

Rural School Sanitation.

In 1911, the National Council of Education of the National Education Association appointed a committee on health problems in education. At the same time, the Council on Health and Public Instruction of the American Medical Association appointed a committee to co-operate with the National Education Association on this subject. These two committees, acting as a joint committee, have for three years been working in this field. The significance and practical value of the co-ordination of the efforts of the teaching and medical professions of the United States is apparent. The possibilities of such co-operation can hardly be over-estimated. After careful consideration, the committee was unanimous in feeling that possibly the most important and certainly the most neglected field in school hygiene was the problem of rural school sanitation. When an effort was made to formulate plans and remedies, however, it was soon realized that although every one was agreed as to the paramount importance of this field, there was little; if any, definite information available regarding actual conditions. It seemed necessary, therefore, that before any remedies were proposed or even discussed, a reasonable amount of data should be secured. Fortunately these conclusions were completely in harmony with the views and policies of the United States Bureau of Education. As Hon. P. P. Claxton, the commissioner, was a member of the joint committee, it was possible to develop a plan for the study of rural school conditions in which all the forces interested could unite. During the spring of 1913, a field secretary employed by the joint committee made a careful statistical and photographic survey of about one hundred rural schools in four eastern states. At the same time, Prof. F. B. Dresslar of the Peabody College of Teachers of Nashville, Tenn., special agent of the federal Bureau of Education, was collecting a large mass of material on country schoolhouses in different states. Additional material was secured from various sources, principally through state boards of health. All this information has been carefully collated, with the result that Bulletin 12 of the United States Bureau of Education, entitled "Rural Schoolhouses and Grounds," contains in its two hundred pages probably more information on this subject than has ever before been collected. For the details of this survey, the large mass of illuminating facts brought out and general conclusions drawn therefrom, the reader is referred to the report itself, which can be secured from the Bureau of Education at Washington. As a result of this study, the joint committee of the National Education Association and the American Medical Association has prepared a statement of minimum requirements for rural schools, being a summary of those conditions of location, construction and equipment which are the very least that should be tolerated in rural schools. This pamphlet can be secured from the Bureau of Education at Washington, from Dr. Thomas D. Wood of Columbia University, New York City, or from the American Medical Association. For the first time in the history of education and sanitation in this country, a reasonably comprehensive collection of facts regarding the sanitary condition of rural schools has been made and a standard of minimum sanitary requirements formulated. Parents, teachers, school boards, health officers and the general public have now been given a standard easily applied and within the physical and economic possibilities of any community. Adoption of this standard, says *The Journal of the American Medical Association,* is the very least that can with decency and fairness to its children be expected of any community. As this standard becomes recognized through the distribution of these pamphlets, it will in a few years be possible to estimate the relative degree of development in any state by the condition of its rural schools. There are many other questions to be considered in solving the health problems in education, but persons interested in the sanitation of rural schools may feel gratified at the substantial and definite progress which has been made through the joint committee in the last three years in this field.

The War and Typhoid Fever.*

In an address delivered before the Society of Tropical Medicine and Hygiene, on November 20, 1914, the well-known medical authority, Sir Wm. Osler, gave in a brief way some of the important facts in regard to the prevention of typhoid fever during the present war.

After a brief summary of the facts commonly known about typhoid fever, i. e., the organism causing the disease, its transmission through polluted water and milk supplies, and its appearance in epidemic form, Osler emphasizes four chief factors seldom taken into consideration except among medical men.

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* Abs. British Medical Journal, Nov. 28, 1914.

The first of these is the importance of the individual case as a factor in infection. Only recently have physicians been accustomed to recognize each case of typhoid fever as a focus from which many new cases are very likely to originate unless strict aseptic and antiseptic measures are adopted and the patient, and in fact everything in the sick room, kept as near sterile as possible. Fingers and flies are more than ever being recognized as the means of spreading infection to secondary cases, and special caution along these lines is a great step toward eliminating many cases of typhoid fever.

The second point of interest is the recognition of the protean character of the disease.

The clinical picture of typhoid often varies much from the typical case pictured in text-books. The organism may enter the body and lie dormant for an indefinite period and then manifest itself not in a typical case of typhoid fever, but in a slight diarrhoea, a bronchitis nephritis, cholecystitis or even pneumonia.

The organism may not cause any symptoms and yet be eliminated in the urine and feces. Dr. Osler gives as an example the case of a young woman who was operated for cholecystitis. Fifteen large gall stones were removed and pure cultures of the typhoid bacillus were obtained from the mucous contents of the bladder, and yet she had never had typhoid fever.

In public health work it is very necessary to recognize these atypical forms as sources of infection. Eight cases of typhoid fever are said to have originated from a case of intestinal catarrh in a child.

The third important point is the discovery of typhoid carriers. In from one to three per cent of typhoid patients the typhoid bacillus remains in the stools and urine long after recovery from the disease. Such a person is a "chronic carrier" and a menace to the community in which he lives. It is estimated that in each one thousand persons two or three are "carriers." This infectivity may continue for years, and scores of small epidemics have been traced to chronic carriers. The fingers of such persons are likely to be covered with typhoid bacilli at any or all times, and any food prepared or handled by them is doubtless infected.

The fourth and last important point is immunization. By this newly discovered prophylaxis, at least temporary immunity is established and many cases of typhoid have been avoided. The real success and importance of anti-typhoid vaccination can be estimated from reports of armies in which the vaccine is used. These show that the number of cases of typhoid diminished from 237 cases in 1907 in an army of 62,000 to 3 cases in 1913 in an army of 90,000. Vaccination was made compulsory in 1911 and in the following two years the annual number of cases dropped from 70 to 3.

Osler thinks that the best chapter in British sanitation is the one on typhoid fever which shows a marked fall in the death rate during the last 20 years. During this time the death rate from typhoid fever fell from 300 per 1,000,000 to 40 per 1,000,000.

"Watch the common ailments" should be the motto of the camp surgeons, and the following recommendations for preventing the spread of typhoid are given:

1. Every recruit having had typhoid or having lived in a house with a typhoid patient during the previous year should be bacteriologically examined.
2. A realization of the extremely protean character of typhoid and careful observation of atypical forms.
3. Consider every patient a focus of infection and if possible cases should be segregated rather than be treated in hospital wards.
4. No patient should be dismissed until he is known to be harmless by bacteriological examination.
5. Ample provision for bacteriological examination of suspected cases.

The author gives a number of instances where statistics show that the deaths from disease have exceeded those from the enemy's bullets, and that even though the slaughter of men in the present war is appalling, the deaths in the United States for 1914, due to typhoid infection, will be equally large. The author further states that during the first months of the war, judging from the meager reports received from the front, there has been comparatively little typhoid and the deaths resulting from the disease are very few. Some of the men are infected before entering the service and wherever such a large number of men are housed without a modern sewerage system there is sure to be some cases of typhoid fever in spite of sanitary precautions.

The Bacteriology of Wounds in the War.

The European war has developed hitherto unused and unexpected methods of warfare. It has also brought new problems in military surgery and new aspects of surgical bacteriology. *The Journal of the American Medical Association* has published foreign correspondence indicating the peculiar nature of some of the wounds encountered and referring to some of the characteristics of the wound infections and their consequences following the injuries received on the battlefields. The reports of some of the bacteriologic investigations which have been conducted in the French hospitals serve to explain some of the consequences and to indicate the surgical procedures that may be called for in the management of the wounded on the French and Belgian frontiers. Metchnikoff states that wounds produced by bullets are frequently free from micro-organisms. The list of bacteria found in wounds dressed in the military hospitals includes many forms of micro-organisms occasionally found in almost pure culture, notably in penetrating wounds of the skull and in simple bullet wounds of limbs. Some are of only slight virulence, and erysipelas is reported in few instances. In most of the open wounds foreign substances such as shrapnel balls, fragments of shells and pieces of clothing are present. The germs of gangrene and tetanus are also found. In a report to the sanitary service of the British army in France, Weinberg argues that it is logical to assume that these organisms found in the wounds are of intestinal derivation. The earth in the trenches from which those suffering with gangrene were taken is often soiled with human dejecta and manure. Remnants of filthy clothing likewise find their way into the wounds.

The Means by Which Infectious Diseases are Transmitted, and Disinfection.*

Years ago certain diseases were recognized as being transmissible from person to person, but the theories regarding the "media of infection" were very vague and groundless. These ideas were gradually changed until the term "fomites" was used to indicate the infective substance whatever it may be. The term "disinfection" was not used but we are told that preventive measures were used to destroy the media of infection. Such measures consisted largely in the burning of powders and herbs and sprinkling with the juices of plants, the most offensive being considered the most effective. The burning of sulphur soon became most popular.

Following the discoveries and publications of Pasteur and Koch many organisms were identified and isolated. At this time the fomites theory was universally accepted and almost every article in sight was considered capable of transmitting infection. It is said that even iron rails were disinfected to prevent the spread of yellow fever. Gradually sanitarians overcame these extreme ideas and began to search for the real mode of infection. Since this time much discussion has been raised and many arguments advanced in regard to the possibility of spreading or carrying diseases in clothing, books, rags, papers, money, toilet articles, etc. In order to disprove some of the more radical of these theories the writer has made a number of personal investigations. While traveling in Egypt, he saw many women and children sorting rags which were largely rejected clothing from the natives of the interior where infections are almost constantly present, and yet the officers in charge had no record of disease having been transmitted in this manner. The second-hand clothing stores in New York City were visited and in many instances the family lived in the rear of the storeroom where the clothing was cleaned and repaired, and yet investigations covering a long period of time failed to show that these people were infected by contact with the clothing.

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* Abstracted, Medical World, October 17, 1914.

No proof could be found that bank tellers and cashiers of stores and other business places are ever infected by the money they handle. Quite often if such persons become ill it is reported that such infection is the cause of the disease but such rumors are seldom proven.

During the Spanish-American War it was reported that the soldiers carried yellow fever in their clothing but since that time it has been found that the disease cannot be had without the bite of the mosquito. Likewise, typhus fever, which was formerly considered very contagious, can only be transmitted by the body louse. Measles, scarlet fever, diphtheria, smallpox and chickenpox are still considered very contagious and many reports are heard in regard to these diseases being transmitted by clothing, books, letters, etc., even years after the original case and yet when properly investigated recent exposure to some mild, unrecognized case is often the real source of infection. Physicians, nurses and health officials who frequently come in contact with these cases rarely if ever carry disease to their families.

The writer further states that what is sometimes considered a mere cold may be a mild attack of measles and may spread infection to other children. In a similar manner a mild attack of diphtheria may be mistaken for sore throat or tonsillitis. The "desquamation" of measles and scarlet fever, which has long been considered as a means of transmitting infection, is now considered far less important than the discharges of the nose and throat. No doubt many cases which have completely desquamated have been released from quarantine while the discharges from the nose and throat are still copious and infective. These discharges are now considered the true media of infection.

The aerial theory of the transmission of diseases has been disproven by recent investigation. Aside from being in close proximity to the patient there is little danger of aerial infection. The public usually believes that infection is present in all public buildings, vehicles, street-cars and, in fact, anything used by the public. Most persons are apt to forget that disease germs are spread by persons and not things. They believe in disinfection after illness and yet neglect seeking proper care during mild infections.

Disinfection is perfectly proper and great care should be exercised in keeping factories, stores, railway coaches, street-cars, hotels and all public thoroughfares free from infection. Hotel rooms and Pullman cars should be kept in the best sanitary condition possible and largely because of this cleanliness infection is seldom spread by these agencies. Personal cleanliness in the sickroom with proper disinfection of all excreta are very important factors in preventing the spread of disease. The public should be taught the value of properly boiling dishes, bed linen, etc., and the use of effective antiseptic solutions. Since those organisms which cause disease originate in and emanate from the bodies of the sick it is very important that patients affected with infectious and communicable diseases be isolated and everything with which they come in contact be thoroughly sterilized before infection is spread to other persons.

Quarantine Defense.*

Quarantine may be defined as the branch of preventive medicine which prevents disease by excluding it. The word originated from the Italian word quarantina or "forty," forty days being the period of detention imposed on certain vessels by the republic of Venice during the Middle Ages. Prior to 1893, this country did not possess a national system of quarantine, thus it was possible for one port to seek business advantages at the cost of others, by imposing lax restrictions. In this year a national quarantine system was established and placed under the direction of the Public Health Service, at that time the Marine Hospital Service. An important amendment to the act releases vessels plying between our own ports and ports on our frontiers from quarantine restrictions except under unusual conditions. This exemplifies the keynote of quarantine defense—a minimum of restriction with a maximum of safety.

The regulations for foreign vessels sailing to our ports do not confine themselves to what is required at our own ports but set forth some requirements to be observed while in foreign ports and at sea. Some of these are: The vessel must be clean in all parts and disinfected if necessary; if carrying passengers she must have proper air space, ventilation, water and food, hospital accommodations, etc.; certain restrictions are placed on her cargo, on the baggage of passengers, and on passengers themselves. Then there are a number of restrictions regarding special diseases, and, finally, a clean bill of health must be obtained from her original port and from all subsequent ports. These bills of health must be obtained from United States consuls or from specially detailed medical officers of the Public Health Service.

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* Abtsracted from The Survey, 1914.

What vessels are subject to quarantine inspection? All vessels from foreign ports, except those near our frontiers; any vessel with sickness on board; vessels from domestic ports where cholera, plague, or yellow fever prevails, or where smallpox, or typhus fever prevails in epidemic form; and certain vessels from yellow fever ports at certain seasons of the year. All such vessels are considered in quarantine upon arrival and must fly the yellow flag until released by the quarantine officials.

With the exception of leprosy, the incubation period of all these diseases is quite definite and of great importance to quarantine officers. The regulations give this period as follows: Cholera, five days; yellow fever, six; plague, seven; smallpox, fourteen; and typhus fever, twelve days. Some communicable diseases, such as typhoid fever, measles, chickenpox and others, do not warrant quarantining.

A quarantine station should be to some extent isolated, and yet convenient to the shipping of the port. It should have adequate provision for boarding vessels, and making inspections, even in rough weather. It should have a large pier with deep water alongside for handling vessels, or else floating craft of its own to take alongside the vessels themselves. There must be apparatus for mechanical cleaning of vessels, and for disinfection by steam, sulphur and formaldehyde, as well as for the use of disinfecting solutions. There should be hospitals for contagious diseases, detention barrack houses for caring for passengers and crews, bathing facilities, a supply of water, a sewage disposal system and a crematory.

During the year ending June 30, 1913, a total of 12,838 vessels were inspected. Of this number, 113 were placed in quarantine and 4,352 were fumigated either for the eradication of infection or else for the destruction of disease carriers, such as rats and mosquitoes.

In conclusion it may be said that the quarantine officers' lot is not always a happy one; and in his dealings with the public he often comes in for a hearty share of undeserved condemnation. It should be kept in mind that he is only doing his duty.

Water Softening and Decolorization.*

The problem of removing color from a water which is to be used as a public water supply, is rendered more difficult by any hardness which the water may contain. In many localities expert supervision of filtration processes is not provided, but it has been demonstrated that no plant can be run successfully by such a "rule of thumb." This is brought more forcibly to the attention of the men who are in charge of plants where color removal is an important part in the filtration process. A comparison is made between the Grand Rapids supply and that which is furnished the city of Columbus. The Columbus supply, obtained from the Scioto River, comes from a catchment area which contains practically no swamps and but little sand. Owing to this fact, the turbidity and total hardness of the Columbus supply rises and falls rapidly. This is caused largely by the fact that the catchment area is composed of clay and outcropping limestone. The problem at Columbus is largely one of changing the chemical treatment of the supply in order to care for the rapid changes of turbidity and hardness. At Grand Rapids the turbidity and hardness do not vary rapidly, due to the character of the soil which is largely sand, and also to the fact that many lakes are present upon the watershed. The color and taste in the water have been observed during the summer time, following a general rain, and are attributed to the washing into the streams of pools formed as a result of low water, the water retained in these pools having absorbed organic color and taste from the leaves and other organic matter which are deposited upon the bottom.

Sulphate of alumina or iron are generally used as decolorizing agents. Their efficiency depends upon the reaction between the alkalinity of the water and the alumina or iron which breaks up to form alumina or iron hydrates. The physical properties of these substances is such that they absorb and reduce color, and at the same time any taste or odor. In the East where the waters are relatively soft but highly colored, it is necessary to introduce lime hydrate in order to get the necessary reaction with the coagulant. At Fargo, North Dakota, it has been observed that iron seems to exert more of a decolorizing and deodorizing power than alum.

At Grand Rapids, where the water is hard and with a color ranging from 16 to 55 parts per million, it was found that the amount of alum necessary to produce a water whose color was 10 parts per million or less, was excessive. That is, a water carrying a color of

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* Abstracted from American Journal of Public Health, Vol. 4, Page 1079.

30 to 40 parts per million requires 3 to 4½ grains per gallon of alum. It was determined, therefore, to try the softening process of the water and use the lime as a decolorizing agent. It was found that unless sufficient lime was added to completely neutralize all bicarbonate or acid alkalinity, that the magnesium was not precipitated in a form to be sufficiently available for decolorizing purposes. The water is therefore softened to a point much lower than 120 or 125 parts per million, or is treated at a greater unit cost in that the partial softening of the water makes it necessary to use alum in addition to the lime. It will be observed from the above that the presence of the magnesium precipitate in the softening process is essential to the decolorization of the water. By reducing the hardness by neutralizing all of the bicarbonates present, it was found that the alum required was reduced to as low as ¼ grain per gallon, its function being largely to help carry down the fine crystals of calcium carbonate formed in the softening process.

In conclusion, the use of lime may be said to offer the advantages of a reduction of both hardness and color at a greatly reduced cost as compared with alum. The disadvantage from the operators' standpoint is one of little importance, being only the criticism of the consumers who when they become accustomed to the soft water notice any slight increase in the hardness of the supply.

The Frequency of Industrial Health-Hazards in the Complaints of Patients. A Physician's Experience.

The following excerpts are from letters written to the Director of the Division of Occupational Diseases, and are published with the consent of the physician who began the correspondence. The physicians' letters are exactly to the point and disclose one of the commonest conditions in physicians' experiences—yet one of the most expensive to society and all parties concerned:

JANUARY 8, 1915.

DR. E. R. HAYHURST, *Director, Division of Occupational Diseases,*
Columbus, Ohio.

DEAR DOCTOR:—In the folder issued by the State Board of Health and entitled "How About Your Health," the request is made for reports of industries or places of work that are regarded as unhealthy. In my practice I have had complaints from several patients who say that their working conditions are detrimental, and sometimes even dangerous. I suggest to them that I will report the place of their employment to the State Board of Health, and they invariably object. They say they do not want to do anything that will imperil their jobs. I cannot insist, for although the folder says that the information cannot be used for any legal purpose it does not assure the person who makes the report that he will neither directly nor indirectly be drawn into the investigation should one follow. It seems that men will work under conditions they know are damaging to their health — will allow themselves to be overworked and underpaid, because they consider the danger of discharge a greater hazard than any with which they are already confronted. Your department is engaged in a most wholesome and commendable enterprise but without the confidential co-operation of the very people who are most vitally concerned your efforts must necessarily be more or less hampered. I am inclined to the belief that the majority of employes do not understand the attitude of the State Board of Health in this matter of improving working conditions and that probably accounts for their reticence in making reports that will be of value to the Board.

If you will kindly advise me as to the likelihood of a workman making such report being drawn into a subsequent investigation I shall appreciate it. I am aware that exaggeration and misrepresentation on their part must be guarded against but that may or may not be another matter. I am specially interested along this line and have some other things I would like to ask but I know I have written at presumptuous length already.

Thanking you in advance for any information or assistance you may give me, I am, Very truly yours,

....

COLUMBUS, OHIO, January 9, 1915.

DEAR DR.—

Your letter has been duly received.

We have never yet called any individual workman into any investigation of workplaces, nor in fact found it necessary to proceed as far even as prosecution in order to rectify dangerous working conditions. Our chief work in the past two years has been a survey of the industrial hygiene of establishments in the state. I think we have covered, and have on file a good percentage of the plants in.............., particularly of the..............industry, and we know that there are a number of very dangerous situations to which workers are exposed. I am surprised, however, that no physician in.............., to my knowledge, has reported a case of occupational disease to us in the past two years, outside of what our own investigators personally discover.

This present session of the Legislature is expected to receive the report which we have to make and pass legislation which will empower the State Board of Health to handle these situations through regulations which it may adopt. In the meantime, all complaints of occupational diseases, such as you mention are totalled together for evidence that such conditions do exist.

In urgent cases the matter is turned over to the Factory Inspector's Department, whose inspectors in the usual course of their duties make inspections and verify the dangers complained of, after which the Industrial Commission issues orders for correction.

Thanking you very much for your letter, which is absolutely to the point, and desiring to assure you that positively no worker is jeopardizing his relations with his employer, I am, Yours very sincerely,

EMERY R. HAYHURST, *Director,*
Division of Occupational Diseases.

JANUARY 31, 1915.

DR. E. R. HAYHURST, *Director,*
Division of Occupational Diseases,
State Board of Health,
Columbus, Ohio.

DEAR DOCTOR: — I am sending you herewith a report of the case of Mr. ——————, who I believe is suffering from the effects of the fumes of gasoline which is being used in paint. He is also exposed to the fumes of turpentine. In addition he has to use sandpaper on the coating after the first coat of filling has dried. This gives rise to considerable dust of which more or less is inhaled. His cough is pretty bad and there is considerable rhinitis. A year ago, he tells me, the company promised to put in a fan or blower to take care of the fumes and dust in this department, but it was not done.

The occupations in which he has been previously engaged are quite numerous and the ones noted in the report are the ones immediately preceding his present occupation, but they are by no means so important as some others in which he has been employed. He worked in a tin mill a year, in a foundry for several years, in a rolling mill for some time and in a stone mill in which he ground lime and limestone for a number of years, or until he was obliged to give it up on account of his health. The dust from the lime and stone caused a severe cough and spitting of blood. He left the stone mill and recovered completely so far as he knows. He never lost time on account of any illness except typhoid fever. He used considerable intoxicating liquor while in the rolling mill, tin mill and on a railroad job, but never lost a job on account of it, and now does not use it at all and has not for four years.

I received your letter of January 9th and thank you for the information contained therein. I am quite sure if there were a more general knowledge of the wholesome purpose of the law and the certain immunity from inconvenience to employes, your department would receive more reports of occupational diseases and also as to the location of unsanitary working conditions. Since reading your letter I feel much freer to make these reports, although my previous restraint may have been entirely imaginary.

Very truly yours,

Lighting of Factories.

Factories should be well lighted, first because poor lighting injures the eyes, and second because poor lighting detracts from the earning capacity of the workmen and is an extravagance. Good lighting is economical. It is strange how little attention is paid to the proper lighting of factories. Beautiful buildings are built, expensive machinery installed, safety devices used, ventilation, cleanliness, rest rooms, sanitary lavatories, etc., adopted, but it frequently happens that the work rooms are very poorly illuminated, and that the eyes of the employees are thus subjected to constant strain. This is sometimes due to economy, but not always, for many employers are anxious and willing to do all they can for the comfort of their employees, and spend a great deal of money for lighting purposes, but their efforts have not been guided by intelligence and experience. The same money or perhaps less would furnish adequate illumination. The question is not always one of fixtures, power and windows, but of considering the nature of the work and how the illumination, both natural and artificial, can be best adapted and arranged to suit the circumstances of the case. Many cases of headache, and of serious eye diseases, as well as accidents to the eye and other organs are due to poor factory illumination.

This matter was considered so important by the French Government, that in 1912, it appointed a committee of scientific men to consider the subject of the proper artificial illumination of factories. This committee studied the problem from the standpoint of general health, and the effect on vision of artificial illumination. It endeavored to determine the composition and quality, from a hygienic standpoint, of the different, combustible illuminants, and to examine the effects of gases and the amount of heat developed; to fix a certain amount of artificial illumination as necessary for the normal requirements of vision and to study the most practical methods of measuring illumination. It also undertook to formulate recommendations for applying customary methods of lighting to the chief varieties of industrial operations, and to present a report on short sight and the impairment of vision, as well as the best methods of guarding against these dangers.

The investigation showed that the sources of high illumination must not be in the field of ordinary vision; that the amount of light must be sufficient for the work to be done; that the distribution of light must be as nearly uniform as possible, and that the color must be pleasing to the eye.

Superior work can only be accomplished under good lighting conditions. Under good lighting conditions vision is preserved, health is conserved, and factory output is increased from 8 to 15 per cent. Accidents are much less likely to occur. The saving produced by good lighting will pay many times over the cost of the installation of good lighting facilities. The maximum number of accidents occur during the time in which artificial light is used. A well lighted factory is more productive than a poorly lighted one. Bad lighting is detrimental to eye-sight and health. It is an extravagance that factory owners cannot afford.

Heat, Humidity and Working Power.

What constitutes a vitiated atmosphere, and wherein are the depressing effects of "bad" air to be found? Of late, temperature and humidity rather than abnormal quantities of the respired gases, carbon dioxide and oxygen, or the presence of harmful expired organic products of respiration, have been held responsible for the untoward consequences of living under conditions of poor ventilation. Drs. Lee and Scott, of the College of Physicians and Surgeons at Columbia University, have recently reported definite objective signs of physical inefficiency in individuals subjected to an atmosphere of high humidity and high temperature. Measurements were made on the working capacity, that is, the total amount of work which excised muscles of animals are capable of doing before exhaustion sets in. The subjects were kept, to cite a specific illustration, at 21 C. (69.8. F.), with an approximate humidity of 54 per cent, in one case, and at 33 C. (91.4 F.), with a humidity of 89 per cent, in the other. The contrasts here quoted represent the distinctions between comfortable atmospheric conditions and the air of a hot, humid summer day. As an outcome there was a marked diminution in both the amount of work performed and the period of working power under the influence of high temperature and humidity. Under these conditions, furthermore, the body temperature also rose somewhat. The facts thus cited in the opinion of *The Journal of the American Medical Association* confirm by the unbiased testimony of direct experiment what the sensations and psychic responses of man have long since intimated.

Formaldehyde Gas.

In the September issue of the Monthly Bulletin we reported an economical method of liberating formaldehyde gas as outlined by the Pennsylvania Department of Health. The method described was the liberation of formaldehyde gas by pouring the solution over sodium dichromate, using a formula of ten ounces sodium dichromate by weight to one pint of a solution of formaldehyde gas and one and one-half fluid ounces of sulphuric acid.

We learn from the Pennsylvania Department of Health that their experience indicates that when the acid is added to the formaldehyde solution previous to storing in very cold places some polymerization takes place in the solution but by adding one and one-half ounces of glycerine to the formula a stable solution that will stand storage in moderately cold rooms is obtained.

Nursing and Philanthrophy.*

The present century is witnessing a gradual but well defined change in the attitude of the public toward the education of nurses.

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*Abst. The Public Health Nurse Quarterly, Vol. VII, No. 1, Jan. 1915.

At least four important training schools are now working under the direction of universities and relationships of a less definite kind exist in several other schools. Probably the chief causes of this result are the general increased interest in education, and the fact that state and municipal bodies have established new forms of service for which they have been dependent upon nurses to help solve these public health problems.

Some of these forms of service, while new to state and city authorities, are really as old as visiting nursing, but new elements have entered into the situation demanding of nurses new standards of efficiency, which will enable them to recognize, understand, and apply judgment to questions of various kinds which are interwoven with the large problem of public health.

Nurses themselves are realizing the great importance of these other aspects of their work, which deal with municipal, economic, and social and industrial questions.

A two years' course in nursing and health is now offered in Teachers' College, and various courses in schools of philanthropy are open to nurses. Bellevue Hospital's Training School for Nurses and the New York School of Philanthropy are each accepting outright a full academic year of work in the other institution in place of its own scheme of instruction, so that a student may secure in three years the diploma of both institutions, work which would ordinarily cover five. It should be borne in mind in this connection that the students who are to enter for this combined course are to bring distinctly higher qualifications than the candidates entering the regular course. If a nurse had some chance to study social problems at the very beginning of her training rather than at the end of it, her path would be illumined in many ways and her work given a new significance. A definite training in nursing would be of incalculable value to social workers. Both nurses and social workers might well bring to their tasks more definite and usable knowledge on the subjects of sanitation, household and municipal, of nutrition and family dietaries, of the budget and purchasing methods in industrial families. It is an experiment well worth making and will be watched with eager anticipation. Of its results probably some of the most valuable will be the least tangible.

Choice of Suitable Nurses for District Work.*

If we were dealing with ideals, that is, were all facilities available for giving instruction, and were the trained product ready at hand, we could settle the question before us in a very few moments by picking out the nurses with all necessary qualifications.

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* Abstr. The Public Health Journal (Canadian)

The subject naturally falls into three divisions: (1) Ideal candidates and ideal instruction; (2) Shortage of suitable material and why; (3) Suggested changes.

We find the district nurse called upon to work among all classes of people, often with limited tools, in poor and dirty surroundings. She comes in contact with many tragedies and sees at close range the seamy side of life. So first, she should have a deep love for humanity, should know men and women, and have a broad intelligent sympathy. We need the cultured, educated woman, who has initiative, executive ability, a well disciplined mind; one who has had good training in nursing, in district work, and who can impart her knowledge to others.

The nurse should have "prevention" for her watchword, and she should know the causes of infant mortality, so that she may look for these causes in her daily rounds and seek to prevent them. In many cases it is the nurse who should step in and make up for the great defect in our public schools—the teaching of the girls the simple lessons in home-making and the care of infants and young children. This one thing every girl should be taught, but it has been carefully left out of our school system, and it is an important element in the prevention of infant mortality.

In tuberculosis work the nurse should realize that the preventive factor is most important, and she should know the causes of the disease so that she can combat them when found.

A nurse must acquaint herself with all the relief agencies in her district, their rules and their efficiency, so that she may be able on short notice to direct any who need guidance to the agency indicated. "The work that tells is the work of the skillful hand, directed by the cool head, and inspired by the loving heart."

The reason for the shortage of suitable women is that our training schools are not sufficiently educative. The education of the nurse has been thrust on the hospitals, where it does not belong, and the length of the training has been increased from one year to three years without having any corresponding increase in the breadth of the course. What do you think of the mental caliber of a woman who needs to make nine thousand beds in order to acquire the requisite skill in bed-making? The training is made unnecessarily arduous, the hours are too long, opportunities for study, for thought, and for recreation are wanting, and at the end of it all the nurse is trained in only one line.

The educational system should provide for the full training of the nurse—using the hospitals for practice fields for institutional nursing, and the home for private nursing, the district for public health nursing, and the schools for school nursing. All of the training, whether practical or theoretical, should be given by experts in their various lines.

As things are now, the nurse must get her training in public health work by means of a post-graduate course. None of the organizations which employ nurses are formed primarily for the purpose of training them, nor is it advisable that they should; but all of these bodies wish to secure nurses chosen and trained especially for their line of work. There should be a central bureau whose board could make the proper adjustments between the nurses and the societies wanting nursing service.

The Victorian Order of Nurses stated seventeen years ago that a special course is necessary to fit the hospital nurse for work on the district, and provided such a course. The regular system of the Order is an ideal one for public health work. There is the Central Board, which is the training, distributing and supervising body for their nurses throughout Canada. This board has representatives from each local committee employing Victorian Order nurses. Centralization, based on co-operation, practically the motto of the Victorian Order,. is what is needed most in our health campaign today.

U. S. Public Health Service Report on a Tuberculosis Treatment.

In response to a resolution of the United States Senate, the Public Health Service has investigated the von Ruck treatment for tuberculosis. The report of these investigations has just been made public as Senate Document 641. This follows close on the report from the same service on the Friedmann treatment, and, as in the latter, the verdict is that von Ruck's claims have not been substantiated.

On account of the evident practical difficulties in carrying out the studies on human beings, the investigation was largely confined to the attempt to confirm or disprove by animal experimentation the reliability and success of von Ruck's methods and practices in the production of immunity to tuberculosis. The studies were begun in Asheville at Dr. von Ruck's laboratory, but were later transferred to the Hygienic Laboratory in Washington, the reason given being that Dr. von Ruck would not concede the right of the government's representatives to conduct an independent and uncontrolled investigation, and summarily interrupted the investigation in Asheville. It would seem from the report that the von Rucks did not have sufficient confidence in their methods to be willing to be investigated unless they had supervision and control over the investigation, truly a remarkable stand for a scientist to take.

One of the most striking portions of the report is that which discusses the attempts made in von Ruck's laboratory by some one interested in the outcome of the experiments to alter the entries in the laboratory record book in regard to the use of controls in certain serum tests. Such an occurrence, as the report states, "had the effect of removing the entire test from consideration as a scientific proceeding," and causes *The Journal of the American Medical Association* to indulge in speculation as to whether the investigation was not desired for reasons other than purely scientific ones.

The Danger of Delay In Cancer.

Thousands of lives now needlessly sacrificed to cancer could be saved if the patient would go to the surgeon as promptly as does the average person attacked by appendicitis. Nor is there any reason why the cancer patient should not seek this, the only safe treatment, with the same high degree of confidence in the outcome that is now common among those suffering from the other more fashionable disease. Unfortunately, the evidence is only too clear that a different attitude toward cancer prevails and occasions many preventable deaths. The almost superstitious dread of the disease and unwillingness to admit its existence or to seek medical advice in time are well known and difficult obstacles to progress in its control. Proof of this fatal neglect is found in the experience of a prominent surgeon who recently studied his case records in order to obtain definite information as to the delay in the average case. Of 65 recent patients, 35 were men and 30 were women. Further study of these 65 cases showed that after the first discovery of suspicious symptoms the men had waited an average of 12.2 months before consulting the doctor, and the women had waited, on the average, 11.9 months, practically a year's delay in all cases. Many other surgeons could produce very similar records. Winter, of Koenigsberg, Prussia, the pioneer in the education of the public in regard to cancer, examined the records of 1,062 operable cases and showed that 87 per cent. of these patients could and should have applied for treatment much earlier, when they would have had a far higher chance of recovery than was actually the case.

To the delay when the symptoms are manifest must be added the previous indefinite period after the beginning of the disease and before the patient realizes the trouble. This period can be shortened by education. Fortunately, the symptoms of cancer are present quite early and can usually be recognized if the patient understands their importance. In too many instances, however, the disease is not suspected until the symptoms are pronounced or until there is a tumor of considerable size. If we assume that this period averages six months, and then add the year's delay for which the patient is responsible, we find that the average patient does not seek advice until at least a year and a half after the onset of cancer. This precious time, thrown away, means, if not a fatal outcome, at least a serious instead of a minor operation.

In the present state of our knowledge of malignant disease it cannot be too frequently emphasized that the hope of curing cancer is to be found in its earlier recognition and in prompt and competent surgical treatment. The unfortunate patient who, because of ignorance or unwarranted fear or the blandishments of quacks, hesitates to seek proper advice should realize that in this delay he or she is recklessly throwing away a splendid chance of cure.

Why Early Cancer is Curable.

There is still a widespread misapprehension that cancer is a constitutional disease caused by some substance or poison in the blood. Those who hold this mistaken opinion commonly believe that the disease is hereditary, and in a vague way they think there must be some taint handed down from one generation to another which causes cancer to flourish in certain families. In the minds of people not well informed on the subject this belief may well cause a feeling that it is somehow shameful to have the disease. Such misapprehension, combined with the notion which has long prevailed that cancer is a hopeless, incurable affliction, and that it is of no use to try to have anything done for it, may well account for the extraordinary delay of many sufferers in seeking treatment. A further cause is the fact that cancer, in the early stages, often causes little or no pain. Many a surgeon has wished that cancer, in its early manifestations, might cause the sufferer half as much trouble as a toothache, for then the patient would surely be driven to seek relief so quickly that he or she would be easily cured.

That cancer is at first a local growth and not a general disease of the system is now clearly established. This fact is of the utmost importance, since it holds out a high hope of cure if the malignant growth is removed before it has time to spread to other parts of the body. Cancer beginning in one spot later appears elsewhere, because small particles or cells are carried away from the first site and start other growths, not because there exists previously some poison in the blood which causes the disease to break out in different parts of the body. The great hope of cure, therefore, lies in removing cancer entirely from the system before it has a chance to spread from its first foothold.

The reason why so many people came to believe that cancer was a blood disease is doubtless because it was observed to come again in the same or other parts of the body after having been apparently cut out. It was natural to assume that when the disease kept coming back in this manner there must be some cause or taint in the blood which led to its breaking out in different places much like certain skin diseases. The trouble which started this fallacious reasoning was that in those earlier days cancer was not so well understood as it now is. Surgeons then did the best they knew how, but without the advantages of modern methods they were unable successfully to exterminate the disease. The microscope has now shown us the paths by which cancer cells start their invasion of the body if the first and local appearance is neglected. Modern surgeons are, therefore, repeatedly successful in removing the disease once for all. As an eminent American doctor has well said "It is not surgery, but *delayed* surgery that fails to cure."

Enumeration of Bacteria in Milk.*

Until bacteriological technique becomes so developed that routine methods can be applied for the detection of pathogenic organisms, those employed in milk examination must be content with the tests obtained by determination of the total numbers. A low bacterial count is an argument that proper care has been exercised in the production of the sample examined. The determination may be made by two methods: by plating on nutrient media and by direct microscopical examination. The media may be gelatine, using 5 days incubation, or agar, using either 24 or 48 hours incubation. The latter medium and 48 hours incubation is recommended by the American Public Health Association.

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* Abstracted from The (Canadian) Public Health Journal, 1915.

Examples of counts by these methods are shown in the following tables:

TABLE NO. 1.

Bacteria Per C.C. On		
Sample Number.	Agar 48 hours at 37°C.	Gelatine 5 days at 20°C.
1	123,000	224,000
2	8,000	8,600
4	10,300	8,800
5	1,300,000	1,500,000
7	85,000	113,000
8	155,000	240,000
9	12,700	8,600

TABLE NO. 2.

Effect of Incubation Period on Agar Counts at 37°C.		
Sample Number.	Incubation 24 hours.	Incubation 48 hours.
684	64,000	140,000
685	1,500	21,000
686	55,000	94,000
687	11,600	16,000
688	8,500	18,000
689	44,000	105,000
690	500	1,600

The agar and gelatine counts, as shown by table No. 1. are about the same. The agar counts, as shown by table No. 2, are more than twice as high after 48 hours incubation as after 24 hours.

The direct method of enumeration of bacteria in milk is briefly as follows: 2 c. c. m. of the sample are inserted into special tubes and centrifugalized for 10 minutes at 2,500 revolutions per minute. The sediment, containing most of the bacteria thrown down is smeared on a glass slide over an area of 4 sq. c. m., dried and stained with methyline blue. The specimen is then examined under the 1/12 inch oil immersion lens and the organisms counted. Each coccus, bacillus, diplococcus or chain represents a colony in the 1-20,000 plate of the same sample when grown on agar at 37° C. for 48 hours. Absolutely correct results are not obtained by either method. Not all bacteria grow on ordinary agar, and in the direct method several sources of error are present. The writer mentions three: (1) Only about 42 percent of the bacteria are thrown down under the standard procedure of centrifugalization, (2) Many of these are in clumps which cannot be separated, (3) A wide variation is noted in the count on different microscopic fields. As a rule, however, the two methods compare very well. Thus Slack, in a series of 2,200 samples, found that taking 500,000 bacteria per c. c. m. by the plate method as a standard, an error of only 1 percent would be made by using the direct method.

The picture presented by the microscopical examination is also valuable owing to the knowledge obtained of the bacterial flora and of the leucocyte content. Thus, streptococci and an excessive number of leucocytes usually associated with pathological conditions, may be detected. In addition, from the approximate number of organisms present, the dilutions suitable for the plate method may be determined.

Medical School Attendance.

The number of college students increases during hard times and diminishes in times of prosperity. The period of depression in the early portion of 1914 was prolonged by the declaration of war. Perhaps as a consequence, at least as a coincidence, three universities, Columbia, California and Pittsburgh, gained over 1,000 students each in all departments; six, Ohio State, Wisconsin, New York University, Minnesota and Pennsylvania, gained more than 500, and five others, Illinois, Nebraska, Cornell, Cincinnati and Michigan, gained over 300.

The increase of registration in hard times is particularly to be noted in the professional schools. Business reverses make men realize that mental capital is of greater permanent value than the material resources.

Our universities now begin to rival even the largest of the foreign universities in the numbers of students registered. During the present year, and while the war lasts, there will be much more educational activity in this country than in any of the countries of Europe. The following universities now have more than 5,000 students in attendance: Columbia, 11,294; California, 8,180; Chicago, 7,131; Wisconsin, 6,696; Pennsylvania, 6,505 ;Harvard, 6,411; Michigan, 6,319; New York University, 6,142; Cornell, 5,939; Illinois, 5,664.

Instead of there being an increase in the enrollment of medical colleges during this session there will be a decided decrease, according to *The Journal of the American Medical Association.* Of about sixty-five medical colleges from which reports have been received, enrollments show that this decrease will be about 8 per cent, as compared with from 3 to 6 per cent in each of the last few years. The raising of the standards for admission to medical colleges, therefore, has had a favorable effect in decreasing the number of those who take up medicine as a life work. The number has been reduced to nearly the normal supply for this country, and that supply will be much better qualified.

Supervision of Communicable Diseases in the Smaller Municipalities.*

In both large and small municipalities the public health work of today is very different from what it was ten or more years ago. At that time the health department, especially in the smaller cities, consisted of a medical man who put up a card whenever an infection was reported to him, and one or more incapacitated men who occasionally rebuked a tenant for an untidy backyard, cesspool or rubbish heap, and burned sulphur in a room previously occupied by an infectious patient. The health department was considered harmless and little heed was given to their demands or instructions.

Such health departments did nothing toward preventing disease but endeavored to meet epidemics or other emergencies as they presented themselves. Each season was certain to bring its usual number of diseases and deaths and very few escaped having all the communicable or infectious diseases.

The public today have passed that stage and have come to realize that many disease are preventable and unnecessary. They want to know the cause of these diseases and how to prevent them.

The present health department consists of well-trained, active men who utilize all modern means of preventing disease. People no longer adhere to the theories that diseases are caused by sewer gas, swamps, and the decomposition of animal and vegetable matter, but realize that many diseases are spread by contact with previous cases either directly or indirectly. The modern health department demands prompt reporting and isolation of such diseases before an epidemic develops. Health departments also have come to realize that it is not the severe case of smallpox, scarlet fever or diphtheria which is the greatest menace to the public for such cases are usually confined to their beds and come in contact with only the physician and nurse. The mild cases are not confined to bed and often do not call a physician, but mingle with their companions on the street and in public places until many people are infected. The health department which quarantines only the severe cases and does not hunt up mild cases and exposures does not perform its obligations to the public.

The supervision of infectious diseases is a scientific, strenuous task and requires a man of great ability and medical training together with much patience and tact. Every municipality of twenty thousand or more should have a whole-time health officer, who can devote his time not to the cleaning of streets or the collection of garbage, but to the prevention of disease and death. The cleaning of streets and garbage collection, etc. are important enterprises but do not require the supervision of a medical man. Such functions can be under the direction of sanitary police and let the health officer devote his time to those matters for which he has special training. Communities of less than twenty thousand may be united to provide a suitable health official.

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* Abstracted, American Journal of Public Health, December 1914.

Because of the difficulties of getting the smaller communities to agree on a choice, the tendency is to place this supervision in the hands of the state. In New York, Maryland and Wisconsin the state is divided into districts each of which is under the direction of a competent health official who helps the local health officer secure more efficient health administration in his community. Minnesota is asking for twenty such men.

REPORT OF THE HYGIENIC LABORATORIES, OHIO STATE BOARD OF HEALTH, FOR THE MONTH ENDING JANUARY 31, 1915.

Diphtheria: Positive 68, negative 191, atypical 5	264
Tuberculosis: Positive 85, negative 267	352
Typhoid: Positive 14, negative 35, atypical 23	72
Rabies: Positive 6, negative 2	8
Miscellaneous 5	5
Total diagnostic	701
Existing water supply, 30, proposed water supply 27	57
Typhoid 19, quality 119	138
Columbus Tap 22	22
Total water	217
Total number of examinations classified as above	918

Date reported, February 2, 1915.

REPORTED CASES OF NOTIFABLE COMMUNICABLE DISEASES, JANUARY, 1915.

	Cities.	*Villages and Townships.*	*Total.*
Chickenpox	773	1,064	1,837
Diphtheria	575	244	819
Measles	292	764	1,056
Mumps	267	779	1,046
Pneumonia	161	362	523
Scarlet Fever	444	639	1,083
Smallpox	131	198	329
Tuberculosis	371	159	530
Typhoid Fever	143	151	294
Whooping Cough	134	443	577
Gonorrhea	3	160	163
German Measles	4	87	91
Epidemic Cerebro-spinal Meningitis	10	5	15
Ophthalmia Neonatorum	71	6	77
Acute Anterior Poliomyelitis	2	2	4
Syphilis	3	21	24
Trachoma	9	9	18
Septic Sore Throat	....	1	1
Favus	1	....	1
Totals	3,394	5,094	8,488

COMMUNICABLE DISEASES, JANUARY, 1915.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
ADAMS COUNTY—										
Manchester Vil.					2			1		
Seaman Vil.			1							1
Winchester Vil.			2	5	4					1
Liberty Tp.						1				
Scott Tp.			1							
Wayne Tp.	2									
ALLEN COUNTY—										
Delphos	3									
Lima	1	2			4	10				
Lafayette Vil.						8				
German Tp.					1					
Perry Tp.		1								
Shawnee Tp.	1									
Sugar Creek Tp.			1							
ASHLAND COUNTY—										
Ashland						8				
Hayesville Vil.					1					
Jeromeville Vil.						1				
Loudonville Vil.							48			
Savannah Vil.				1				1		2
Clear Creek Tp.				1				1		2
Green Tp.	2						2			
Hanover Tp.	2	1					6	1		
Lake Tp.						1				
Mohican Tp.						1				
Orange Tp.	2					2				
Perry Tp.	38			10		1				
Ruggles Tp.	1			2						
Troy Tp.					1					
Vermillion Tp.										10
ASHTABULA COUNTY—										
Ashtabula		9				3	1			
Conneaut		8				2	1			
Andover Vil.	1									
Geneva Vil.							4		1	
North Kingsville Vil.		1								
Rock Creek Vil.		1								
Andover Tp.	1									
Ashtabula Tp.		1								
Geneva Tp.							11			
Kingsville Tp.					1					
Lenox Tp.								1		6
Monroe Tp.	5						1	1		
New Lyme Tp.					1					
Rome Tp.	4									
Saybrook Tp.	1					2				
Trumbull Tp.									1	
ATHENS COUNTY—										
Nelsonville			50							
Chauncey Vil.	5		50	3						
Alexander Tp.			1		1			1	1	
Athens Tp.			3							
Dover Tp.	4	2							1	4
Lee Tp.		1	6							
Rome Tp.	6		32					1		
Waterloo Tp.						3				
York Tp.					1					
AUGLAIZE COUNTY—										
St. Marys		3								
Wapakoneta								1		
Buckland Vil.	2			5	1					

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
AUGLAIZE COUNTY—Concluded.										
Minster *Vil.*									8	
New Bremen *Vil.*				1						
New Knoxville *Vil.*						2				
Waynesfield *Vil.*					1					
German *Tp.*	2			1		1				
Logan *Tp.*			1	6	1					
St. Marys *Tp.*	4					2				
Union *Tp.*	2							1		
Washington *Tp.*						6				
Wayne *Tp.*					2	1				
BELMONT COUNTY—										
Bellaire		4				8			4	
Martins Ferry	1	8				1		2	2	
Barnesville *Vil.*	4	1						1		
Belmont *Vil.*								1		
Bridgeport *Vil.*		8	1							
Brookside *Vil.*										2
Flushing *Vil.*				1						
St. Clairsville *Vil.*									5	
Shadyside *Vil.*	1	1				2			1	
Colerain *Tp.*		8				2		8	4	
Goshen *Tp.*	2									
Pease *Tp.*		4				2				
Pultney *Tp.*		1			8	1		1		
Richland *Tp.*					1			1	6	
Somerset *Tp.*	6									1
Union *Tp.*	23			11	2			2		
Warren *Tp.*		1								
Wayne *Tp.*					4					6
Wheeling *Tp.*	2									
York *Tp.*					4	22		1		
BROWN COUNTY—										
Aberdeen *Vil.*			10	50						
Fayetteville *Vil.*					4					
Hamersville *Vil.*					1					
Sardinia *Vil.*	3									
Clark *Tp.*					5					
Eagle *Tp.*				75						
Huntington *Tp.*			2		1				1	
Jackson *Tp.*	4									
Jefferson *Tp.*					8					
Pike *Tp.*									1	
Scott *Tp.*									1	1
BUTLER COUNTY—										
Hamilton		1				1		17		
Middletown		1								
Oxford *Vil.*										4
Seven Mile *Vil.*		1								
Reily *Tp.*					1					8
Ross *Tp.*					2					
Union *Tp.*				1	1					
CARROLL COUNTY—										
Carrollton *Vil.*					1	1				
Center *Tp.*						8				
Harrison *Tp.*	1					3			1	
London *Tp.*						2				
Monroe *Tp.*									1	
Perry *Tp.*					1					
Washington *Tp.*						1				
CHAMPAIGN COUNTY—										
North Lewisburg *Vil.*						1				
St. Paris *Vil.*				1		1		1		8
Adams *Tp.*				1						
Jackson *Tp.*					1					6

COMMUNICABLE DISEASES, JANUARY, 1915 — Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
CHAMPAIGN COUNTY—Concluded.										
Mad River *Tp.*	1									
Salem *Tp.*	6					2				
Union *Tp.*	4									
Urbana *Tp.*						4				
Wayne *Tp.*	2				1					
CLARK COUNTY—										
Springfield	22	6	1	8		11		6	1	
Enon *Vil.*	18				1					
South Vienna *Vil.*				1						
German *Tp.*		1								
Harmony *Tp.*	4			1						
Madison *Tp.*					2	7		2		
Mad River *Tp.*	6									
Pleasant *Tp.*						2				
Springfield *Tp.*						1				
CLERMONT COUNTY—										
Batavia *Vil.*	4				2			1		
Bethel *Vil.*	8					2				
Loveland *Vil.*	a			5	2					
Owensville *Vil.*				1						
Batavia *Tp.*	10		5		5			1	1	
Goshen *Tp.*	1									
Jackson *Tp.*					6					
Miami *Tp.*				5	2					
Monroe *Tp.*	2				1			1		
Pierce *Tp.*				8						
Tate *Tp.*	8	1		9	4	4		1		
Union *Tp.*						1				
CLINTON COUNTY—										
Blanchester *Vil.*								1		
Midland *Vil.*	5			1	8			1		
Jefferson *Tp.*					2			2		
Liberty *Tp.*						1				
Union *Tp.*					1					
COLUMBIANA COUNTY—										
East Liverpool	6	8				6	8			
Salem	12		88			1				
Wellsville	1	2							6	
Leetonia *Vil.*	2			8			8	1		
New Waterford *Vil.*				14						
Salineville *Vil.*	8									
Elk Run *Tp.*		1								
Franklin *Tp.*	2							1		
Hanover *Tp.*			1			2				
Knox *Tp.*									1	
Liverpool *Tp.*	1	2				1	1			
Madison *Tp.*									1	
Salem *Tp.*		1	1				1			
St. Clair *Tp.*							10			
Washington *Tp.*							1			
Wayne *Tp.*		8								
West *Tp.*					1			1	1	
Yellow Creek *Tp.*							2			
COSHOCTON COUNTY—										
Coshocton		2	1			8				
Plainfield *Vil.*		2								
Roscoe *Vil.*				35						
West Lafayette *Vil.*					2					
Bedford *Tp.*					4				2	
Clark *Tp.*			1							
Crawford *Tp.*						2				
Franklin *Tp.*		2								

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a Presence of disease reported but number of cases not specified.

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
COSHOCTON COUNTY—Concluded.										
Jackson Tp.				6						
Lafayette Tp.		1								
Linton Tp.		1				6				
New Castle Tp.					1			1		
Oxford Tp.					1	3				
Tiverton Tp.			1	2						
Tuscarawas Tp.				5						
White Eyes Tp.				6		5				
CRAWFORD COUNTY—										
Bucyrus	1	1				3	1		1	1
Galion		3								
New Washington Vil.			1							
Chatfield Tp.						2				
Cranberry Tp.						1				
Jefferson Tp.							1			
Liberty Tp.	2					3				
Polk Tp.	1	5								1
Vernon Tp.		2								
CUYAHOGA COUNTY—										
Cleveland	204	212	27	21	128	74	10	105	17	39
East Cleveland	21	1		1		4				
Lakewood	4	2	2			9				
Bedford Vil.									2	
Berea Vil.		1				1			1	
Bratenahl Vil.	18									
Brook Park Vil.	7				1			1		
Chagrin Falls Vil.								1		
Cleveland Heights Vil.	2	4						1		
Rocky River Vil.									1	1
Shaker Heights Vil.	2									
Newburgh Heights Vil.	2									
West Park Vil.		2								
Brecksville Tp.								1		
Chagrin Falls Tp.						1				
Euclid Tp.	6								1	
Independence Tp.				1	1					
Parma Tp.			1							
Royalton Tp.		1								
Strongsville Tp.						2				
DARKE COUNTY—										
Greenville						2		1		
Gettysburg Vil.										1
New Madison Vil.									1	5
Osgood Vil.				3		2		2		
Palestine Vil.										15
Pitsburg Vil.	2									
Rossburg Vil.						1				
Union City Vil.							1			2
Versailles Vil.						2				
Yorkshire Vil.						2				
Adams Tp.				8	1					8
Allen Tp.						1				
Brown Tp.									2	
German Tp.					4	2				a
Jackson Tp.							4			
Monroe Tp.	2							1		
Patterson Tp.						10				
Richland Tp.										5
Wayne Tp.						6				
York Tp.						4				

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a Presence of disease reported, number of cases not specified.

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
DEFIANCE COUNTY—										
Defiance	1	1	2			2			1	
Hicksville *Vil.*	1			4			8			
Defiance *Tp.*	8									
Farmer *Tp.*	8				1					
Washington *Tp.*								2	1	
DELAWARE COUNTY—										
Delaware						8		1		
Ashley *Vil.*				1	2			2	1	
Sunbury *Vil.*		1								
Berkshire *Tp.*		1								
Concord *Tp.*						2		1		
Liberty *Tp.*						1				
Porter *Tp.*					9				1	18
Scioto *Tp.*						8				
ERIE COUNTY—										
Sandusky	14	2				1	15	8		
Berlin Heights *Vil.*						1				
Huron *Vil.*		8								
Vermilion *Vil.*									1	
Berlin *Tp.*						1				
Groton *Tp.*			1				2			
Huron *Tp.*	2									
Margaretta *Tp.*					1		6			
Oxford *Tp.*					8					
FAIRFIELD COUNTY—										
Lancaster		8				4				
Bremen *Vil.*				1						
Pickerington *Vil.*	12				2					1
Clear Creek *Tp.*		8								
Greenfield *Tp.*						1				
Madison *Tp.*		1								
Pleasant *Tp.*	10	4			2					
Richland *Tp.*	1									
Rush Creek *Tp.*						2				
Walnut *Tp.*		1								4
FAYETTE COUNTY—										
Washington C. H.					1			1		
Bloomingburg *Vil.*								2		
Jeffersonville *Vil.*								2		
Green *Tp.*				8		8		1		
Jasper *Tp.*					1					
Jefferson *Tp.*						6				
Union *Tp.*						1		1		
FRANKLIN COUNTY—										
Columbus	65	25	1			21	1	16	2	6
Bexley *Vil.*		1								
East Linden *Vil.*		1								
Grandview Heights *Vil.*		1								
Linden Heights *Vil.*	1	1								
New Albany *Vil.*					1					
Westerville *Vil.*		1								
Worthington *Vil.*	1					2				
Brown *Tp.*				1		1				
Franklin *Tp.*						8				
Madison *Tp.*		1				2			1	
Marion *Tp.*		2		8		8				
Norwich *Tp.*					8	1			1	
Plain *Tp.*					2					
Sharon *Tp.*					2					
FULTON COUNTY—										
Lyons *Vil.*				16	2			1		
Swanton *Vil.*	2		3							
Wauseon *Vil.*			6			5				
Dover *Tp.*			2					8		

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
FULTON COUNTY—Concluded.										
Franklin *Tp.*			6							
German *Tp.*			6	2						6
Royalton *Tp.*					8					
GALLIA COUNTY—										
Gallipolis			1							
Vinton *Vil.*	15		1							
Gallipolis *Tp.*	1		2							
Ohio *Tp.*									2	
Raccoon *Tp.*				6						
GEAUGA COUNTY—										
Chardon *Vil.*		1				1				
Bainbridge *Tp.*					4					
Newberry *Tp.*						5				
GREENE COUNTY—										
Clifton *Vil.*		1								
Yellow Springs *Vil.*			1		1	2		1		
Beaver Creek *Tp.*										8
Spring Valley *Vil.*					2			1		
Caesar Creek *Tp.*	5				4	1		6	1	
Jefferson *Tp.*								1		
Miami *Tp.*		1		2	1					
Silver Creek *Tp.*					2					
Spring Valley *Tp.*	4		1							
Xenia *Tp.*						1				
GUERNSEY COUNTY—										
Cambridge	1	2				4		2		
Fairview *Vil.*					9					4
Cambridge *Tp.*		1				2				
Jackson *Tp.*		4								
Jefferson *Tp.*					1	2				
Londonderry *Tp.*					2	1				11
Monroe *Tp.*					1	2				
Valley *Tp.*						2				
HAMILTON COUNTY—										
Cincinnati	78	89	8	80		39	5	114	9	22
Norwood	80	2	1	144				1		10
St. Bernard		1				6				
Addyston *Vil.*					1				2	
Cleves *Vil.*		8		2		9				
Lockland *Vil.*				8						
Madeira *Vil.*										1
Mt. Healthy *Vil.*				1		1				
Silverton *Vil.*		1		20						
Crosby *Tp.*						1				
Springfield *Tp.*						2				
Symmes *Tp.*				[a]	2					2
Whitewater *Tp.*					1	1				
HANCOCK COUNTY										
Findlay	2	1	2			8	8	5	2	
Mt. Blanchard *Vil.*									1	
Van Buren *Vil.*			1							
Amanda *Tp.*									1	
Delaware *Tp.*	1		2	1						1
Madison *Tp.*						4				
Washington *Tp.*						1				
HARDIN COUNTY—										
Ada *Vil.*				5						
Dunkirk *Vil.*					1					
Cessna *Tp.*					1					
Dudley *Tp.*	8						1		1	2
McDonald *Tp.*							7			
Pleasant *Tp.*		1								
Roundhead *Tp.*					2					

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[a] Presence of disease reported but number of cases not specified.

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.		Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
HARRISON COUNTY—											
Cadiz	*Vil.*	4					2				
Freeport	*Vil.*		1			2					
New Athens	*Vil.*					1				2	
Cadiz	*Tp.*	2									
German	*Tp.*						12				
Moorefield	*Tp.*					1				1	
Nottingham	*Tp.*						1				
Short Creek	*Tp.*	67			2	1			1		
HENRY COUNTY—											
Deshler	*Vil.*		1								
Holgate	*Vil.*			3	5				1		
Liberty Center	*Vil.*			1							
Malinta	*Vil.*	2									
Flat Rock	*Tp.*			7							
Harrison	*Tp.*	2		25		1					
Liberty	*Tp.*			8							
Marion	*Tp.*			30							
Pleasant	*Tp.*			18	1				1		
Washington	*Tp.*			24							
HIGHLAND COUNTY—											
Greenfield	*Vil.*		1			5				3	
Leesburg	*Vil.*	4			4		1				
Lynchburg	*Vil.*					1					
Mowrystown	*Vil.*		2								
Brush Creek	*Tp.*							1			
Concord	*Tp.*						4				
Paint	*Tp.*	11									
Penn	*Tp.*	2			2		2				
Union	*Tp.*	1				2					
White Oak	*Tp.*		1								
HOCKING COUNTY—											
Logan	*Vil.*		1					1			
Murray City	*Vil.*								1		
Benton	*Tp.*						4				
Falls	*Tp.*						8				
Green	*Tp.*					3					
Starr	*Tp.*	15	5			3	1				
Ward	*Tp.*		1								
HOLMES COUNTY—											
Holmesville	*Vil.*	5									12
Millersburg	*Vil.*										8
Berlin	*Tp.*	*a*					1				
Knox	*Tp.*							1			
Prairie	*Tp.*	8									10
Richland	*Tp.*	7									
Ripley	*Tp.*	8									
Walnut Creek	*Tp.*		2			1					
Washington	*Tp.*	8				2					
HURON COUNTY—											
Bellevue		1					2				
Norwalk							1				
Greenwich	*Vil.*				11	1					
Monroeville	*Vil.*	1					2				
Greenwich	*Tp.*				9						
Lyme	*Tp.*	1					2				
New Haven	*Tp.*									1	
Norwich	*Tp.*						2				
Richmond	*Tp.*	2									
Ridgefield	*Tp.*	6				1					
Wakeman	*Tp.*	4									

a Presence of disease reported but number of cases not specified.

COMMUNICABLE DISEASES, JANUARY, 1915 — Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
JACKSON COUNTY —										
Jackson		1				1				
Wellston		2	2							
Oak Hill *Vil.*				50						
Coal *Tp.*		1								
Jefferson *Tp.*				65	2					
Liberty *Tp.*		2								
Lick *Tp.*		2								
Madison *Tp.*					1					
Milton *Tp.*		1				1				
JEFFERSON COUNTY —										
Steubenville	3	8				2			13	
Amsterdam *Vil.*						4				
Bergholz *Vil.*				2					2	
Brilliant *Vil.*				1						
Empire *Vil.*		2								
Smithfield *Vil.*					1					
Stratton *Vil.*	2	1								
Tiltonville *Vil.*	1									
Toronto *Vil.*		6							3	
Cross Creek *Tp.*			1							
Island Creek *Tp.*		1								
Salem *Tp.*						4				
Springfield *Tp.*									7	
Steubenville *Tp.*		2								
Wells *Tp.*	7			1						
KNOX COUNTY —										
Mt. Vernon	4						1			
Buckeye City *Vil.*	2									
Centerburg *Vil.*					1					4
Danville *Vil.*	3									
Fredericktown *Vil.*	1								1	
Gambier *Vil.*						1				
Berlin *Tp.*						3				
Jackson *Tp.*					3					
Morgan *Tp.*						1				
Pike *Tp.*						1				
Pleasant *Tp.*						1				
Union *Tp.*	35									
LAKE COUNTY —										
Painesville *Tp.*						2				
Grand River P. O. *Vil.*	1									
Mentor *Vil.*						1				
Concord *Tp.*		3								
Painesville *Tp.*							3			
LAWRENCE COUNTY —										
Ironton	1					3			5	
Hanging Rock *Vil.*						2		1		
South Point *Vil.*					1					
Aid *Tp.*									3	
Mason *Tp.*				10	1				1	
Perry *Tp.*	3							1		
Union *Tp.*		1			3	2				
Washington *Tp.*		2	1						2	
LICKING COUNTY —										
Newark	52	5	1			3				
Granville *Vil.*	5			1						
Hebron *Vil.*	1									
Utica *Vil.*						1		1		
Bennington *Tp.*	5					3				
Bowling Green *Tp.*	1									
Hartford *Tp.*	1					1				1
Madison *Tp.*	13	1						1		1
Monroe *Tp.*						1				
Washington *Tp.*									2	3

COMMUNICABLE DISEASES, JANUARY, 1915 — Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
LOGAN COUNTY —										
Bellefontaine	20		1			4				
De Graff *Vil.*	1									
Huntsville *Vil.*	5									
Rushsylvania *Vil.*									1	
West Liberty *Vil.*	2	2								
West Mansfield *Vil.*						2				
Bokes Creek *Tp.*							1			
McArthur *Tp.*	3				1					
Miami *Tp.*	1									
Monroe *Tp.*						1				
Perry *Tp.*	5									
Pleasant *Tp.*	4									
Richland *Tp.*			1							
Rush Creek *Tp.*			1							
Stokes *Tp.*		1								
Washington *Tp.*			6							
Zane *Tp.*	3			2	3	9		1	3	
LORAIN COUNTY —										
Elyria	11	3	7			3	3		1	5
Lorain	13								3	
Amherst *Vil.*		1			1					
La Grange *Vil.*	1									
Oberlin *Vil.*		1				1			1	
Amherst *Tp.*	5								1	
Avon *Tp.*									1	
Avon Lake *Tp.*	4		1							
Carlisle *Tp.*		2								
Columbia *Tp.*	3									
Eaton *Tp.*	3	1								
Elyria *Tp.*										6
Grafton *Tp.*						1				
La Grange *Tp.*	1					1				6
Ridgeville *Tp.*					2			1		
LUCAS COUNTY —										
Toledo	81	38	43			31	7	38	13	30
Maumee *Vil.*						1				
Sylvania *Vil.*						1				
Waterville *Vil.*						2				
Oregon *Tp.*						1				
Springfield *Tp.*	20	1						1	2	
Washington *Tp.*	1		1			8			1	
MADISON COUNTY —										
London *Vil.*						4				
Mt. Sterling *Vil.*	1		2		2					8
Deer Creek *Tp.*						3				
Fairfield *Tp.*									1	
Monroe *Tp.*	5	2			1					
Paint *Tp.*						2				
Pike *Tp.*						1				
Pleasant *Tp.*								1		
Union *Tp.*						1				
MAHONING COUNTY —										
Youngstown *Vil.*		10				11		12	4	1
East Youngstown *Vil.*	6			1		2		1		
Poland *Vil.*								1		
Sebring *Vil.*	6	1	1							
Struthers *Vil.*	4		1							
Beaver *Tp.*				1						
Berlin *Tp.*	10			6	1					
Boardman *Tp.*		2							2	
Canfield *Tp.*			1					1		
Coitsville *Tp.*	1									
Ellsworth *Tp.*				4						
Green *Tp.*	5				5			1		

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
MAHONING COUNTY—Concluded.										
Milton *Tp.*					1					
Poland *Tp.*	2	1								
Smith *Tp.*					1					
Springfield *Tp.*	1									
MARION COUNTY—										
Marion	3	1								
La Rue *Vil.*										1
Prospect *Vil.*						1				
Big Island *Tp.*						2				
Bowling Green *Tp.*	2									
Marion *Tp.*		1								
Montgomery *Tp.*	1	1		5			1			2
Scott *Tp.*						2				
Tully *Tp.*						1				
MEDINA COUNTY—										
Medina *Vil.*	5						3			
Wadsworth *Vil.*						1		1	2	
Brunswick *Tp.*				1						
Granger *Tp.*					1					
Hinckley *Tp.*	3							1		
Litchfield *Tp.*	4								1	
Spencer *Tp.*	3									
Wadsworth *Tp.*						1				
York *Tp.*						1				
MEIGS COUNTY—										
Racine *Vil.*					3			1		
Rutland *Vil.*	1									
Bedford *Tp.*	12									
Columbia *Tp.*					1					
Rutland *Tp.*						1				
Salem *Tp.*			3	2						
Sutton *Tp.*	3									
MERCER COUNTY—										
Celina *Vil.*		1								
Coldwater *Vil.*		3								
Fort Recovery *Vil.*		2								
Rockford *Vil.*			2							6
St. Henry *Vil.*						1				
Butler *Tp.*									1	
Hopewell *Tp.*						1				
Center *Tp.*						2		2		
Liberty *Tp.*										50
Marion *Tp.*				4	1	9				
Union *Tp.*									1	20
Washington *Tp.*		1							1	
MIAMI COUNTY—										
Piqua	2		1			9				
Troy		3				6				
Bradford *Vil.*				36				1		
Casstown *Vil.*	1				2					
Covington *Vil.*		1								
Milton *Vil.*						1				
New Lebanon *Vil.*					1					
Bethel *Tp.*					1					
Concord *Tp.*						1				
Lost Creek *Tp.*	1				1					
Springcreek *Tp.*	1					2			1	
Staunton *Tp.*						1				
Union *Tp.*										3
Washington *Tp.*		1								
MONROE COUNTY—										
Jerusalem *Vil.*					1					
Woodsfield *Vil.*			1							
Ohio *Tp.*						4				

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.		Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
MONROE COUNTY—Concluded.											
Summit	*Tp.*					1					
Sunsbury	*Tp.*						5				
Wayne	*Tp.*	3				1				1	6
MONTGOMERY COUNTY—											
Dayton		37	32	59	17	28	50	1	23	10	8
Brookville	*Vil.*						1				
Miamisburg	*Vil.*						2				
New Lebanon	*Vil.*			3							
Trotwood	*Vil.*										1
West Carrollton	*Vil.*								1		
Harrison	*Tp.*		1				4				
Jefferson	*Tp.*	8	1	3			7		1		
Madison	*Tp.*	7					1				
Perry	*Tp.*					2			1		7
Van Buren	*Tp.*		2								
MORGAN COUNTY—											
Chesterhill	*Vil.*					1				1	
Malta	*Vil.*										37
Penn	*Tp.*					3			4		
Bloom	*Tp.*	2									
Center	*Tp.*	9			4						
Manchester	*Tp.*				1						
MORROW COUNTY—											
Cardington	*Vil.*									1	
South Bloomfield	*Tp.*					2					4
Troy	*Tp.*						1				
Chester	*Tp.*								1		
MUSKINGUM COUNTY—											
Zanesville		3	4				2	1	1	39	
Fultonham P. O.	*Vil.*				1						
New Concord	*Vil.*						4				
South Zanesville	*Vil.*	1					4				
Cass	*Tp.*		1								
Falls	*Tp.*				2					2	4
Highland	*Tp.*	4									
Jackson	*Tp.*			1					2		
Madison	*Tp.*						1				
Meigs	*Tp.*				4	1					
Newton	*Tp.*				2	2			1		
Salem	*Tp.*								1		
Salt Creek	*Tp.*									1	
Wayne	*Tp.*		1		3					1	
NOBLE COUNTY—											
Batesville	*Vil.*								1		
Berne P. O.	*Vil.*								1		
Noble	*Tp.*	2				1			1		
Seneca	*Tp.*		1								
Wayne	*Tp.*	17									
OTTAWA COUNTY—											
Oak Harbor	*Vil.*								1		
Port Clinton	*Vil.*						8				
Put-in-Bay	*Vil.*							1			
Allen	*Tp.*		1								
Benton	*Tp.*		3				1				
Carroll	*Tp.*						4				
Danbury	*Tp.*	5					2				5
Erie	*Tp.*	1		1		1				1	3
Salem	*Tp.*								1		
PAULDING COUNTY—											
Melrose	*Vil.*	10							1		
Oakwood	*Vil.*				5						
Paulding	*Vil.*			1				3			
Benton	*Tp.*							1			
Blue Creek	*Tp.*			2				1			

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
PAULDING COUNTY—Concluded.										
Brown Tp.							1			
Carryall Tp.	8									
Harrison Tp.						4				
Jackson Tp.							12	1		
Paulding Tp.	2	3		4			5	1		
Washington Tp.							1			
PERRY COUNTY—										
Corning Vil.	2								2	
Crooksville Vil.						3				
Hemlock Vil.	3					1			1	
Junction City Vil.	2							2		
New Straitsville Vil.					7					
Santoy Vil.	9									
Somerset Vil.	5									
Thornville Vil.	8							1		
Harrison Tp.						4				
Hopewell Tp.						2				
Jackson Tp.					2	6				
Madison Tp.				*a*					1	
Monday Creek Tp.									1	
Monroe Tp.		2								
Pike Tp.			1							
Pleasant Tp.								1		
Reading Tp.			22							
Thorn Tp.			1					1	1	
PICKAWAY COUNTY—	5		2					1	1	
Ashville Vil.	8									
Darbyville Vil.	5			*a*	*a*			2	4	
New Holland Vil.					1					
Darby Tp.	1					1			1	
Pickaway Tp.						1				
Scioto Tp.		1								
Wayne Tp.						5				
PIKE COUNTY—										
Marion Tp.						2				
Perry Tp.				1	1					
Pebble Tp.				5						
PORTAGE COUNTY—										
Ravenna		2	1			2	8			
Garrettsville Vil.								1		
Hiram Vil.	12									
Kent Vil.	1	2				1				
Mantua Vil.						4				
Aurora Tp.					2					
Broomfield Tp.		1								
Deerfield Tp.			1	5	1	1		1		6
Hiram Tp.	11			2	5					
Mantua Tp.		2				1				
Nelson Tp.						2				
Streetsboro Tp.		2								
PREBLE COUNTY—										
Eaton Vil.		2							1	
Lewisburg Vil.					1					
New Paris Vil.			1	3						
West Alexandria Vil.		4								
Dixon Tp.	3					1				
Israel Tp.										5
Jackson Tp.			25	4						
Jefferson Tp.			1		2					
Lanier Tp.		3								10
Somers Tp.					4					
Twin Tp.				1	2					
Washington Tp.					2					2

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a Presence of disease reported but number of cases not specified.

COMMUNICABLE DISEASES, JANUARY, 1915 — Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
PUTNAM COUNTY—										
Belmore *Vil.*		1								
Columbus Grove *Vil.*	8		24	6	5			2	1	
Dupont *Vil.*										1
Gilboa *Vil.*	12									
Glandorf *Vil.*			60							
Kalida *Vil.*			2							
Miller City *Vil.*			1							
Ottoville *Vil.*						4			2	
Greensburg *Tp.*			15			2				
Jackson *Tp.*						8				
Monroe *Tp.*						2				
Monterey *Tp.*						2				
Palmer *Tp.*			26							
Pleasant *Tp.*			11	10	2			2	1	
Riley *Tp.*		1								
Union *Tp.*			40							
Van Buren *Tp.*		1				8				
RICHLAND COUNTY—										
Mansfield	2	12	1			8		2	1	2
Bellville *Vil.*			1							
Lexington *Vil.*						2				
Blooming Grove *Tp.*				2						
Madison *Tp.*	1	7		10	5	1		4		6
Mifflin *Tp.*	8									
Sandusky *Tp.*						4				
Springfield *Tp.*	5									
Worthington *Tp.*							4			
ROSS COUNTY—										
Chillicothe		1				1		1		
Kingston *Vil.*	6			12						
Buckskin *Tp.*				6	1					
Concord *Tp.*		1								
Green *Tp.*	2									
Harrison *Tp.*		1				1				
Huntington *Tp.*				5				1		
Paint *Tp.*	3			1	8			1		
Springfield *Tp.*		3								
Twin *Tp.*				15	1					3
Union *Tp.*						7				
SANDUSKY COUNTY—										
Fremont	8	1		1		3	2	1		
Clyde *Vil.*						3				
Ballville *Tp.*	2								1	
Madison *Tp.*										1
Riley *Tp.*					1					
Sandusky *Tp.*						1			3	
Scott *Tp.*						1				
Townsend *Tp.*					2				4	
Washington *Tp.*						4				
York *Tp.*										*a*
SCIOTO COUNTY—										
Portsmouth		2			3			4	4	
New Boston *Vil.*										10
Rarden *Vil.*								1	1	5
Madison *Tp.*									2	
Washington *Tp.*	4			2	3			1		
SENECA COUNTY—										
Fostoria	14	9				9	11			
Tiffin	3	1						1		
Bloomville *Vil.*	2		4							4
Greensburg *Vil.*		6								
Adams *Tp.*								2		

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a Presence of disease reported but number of cases not specified.

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
SENECA COUNTY—Concluded.										
Bloom *Tp.*								1		4
Eden *Tp.*		2								
Jackson *Tp.*						1				
London *Tp.*	1						1			
Pleasant *Tp.*	1									
Reed *Tp.*			1							
Seneca *Tp.*					1			1		
Thompson *Tp.*	9									
Venice *Tp.*					4	1				2
SHELBY COUNTY—										
Sidney						1				
Anna *Vil.*		3								
Botkins *Vil.*	1									
Kettlersville *Vil.*	1									
Cynthiana *Tp.*						1				
Dinsmore *Tp.*	10									
Franklin *Tp.*						4				
McLean *Tp.*						2				
Salem *Tp.*						6				
Van Buren *Tp.*	1		1							
Washington *Tp.*					1					
STARK COUNTY—										
Alliance	4	10	1			9		2		
Canton	13	18				39	43	4	3	8
Massillon	1		1							
Beach City *Vil.*						2				
Canal Fulton *Vil.*			17			1				
Limaville *Vil.*	5									
Magnolia *Vil.*						1				
Minerva *Vil.*	1					1				
Osnaburg *Vil.*		1				1				
Waynesburg *Vil.*	1									
Canton *Tp.*		1				3	3			
Lake *Tp.*							1			
Lawrence *Tp.*					1					1
Marlboro *Tp.*									1	
Nimishillen *Tp.*						4				
Osnaburg *Tp.*						10				
Perry *Tp.*		7								
Pike *Tp.*					4			1		
Plain *Tp.*						1	1			
Tuscarawas *Tp.*			4			2				
SUMMIT COUNTY—										
Akron	8	19	4			7	3		1	1
Barberton	1	2				2				
Cuyahoga Falls *Vil.*	5									
Kenmore *Vil.*						4				
Mogadore *Vil.*	1									
Northfield *Vil.*				1						
Peninsula *Vil.*	2									
Western Star *Vil.*	2									
Bath *Tp.*		1				1				
Springfield *Tp.*	2				1					
TRUMBULL COUNTY—										
Niles						1				
Warren		1				1				
Cortland *Vil.*	5			2	1					
Girard *Vil.*	a	1						1		
Mineral Ridge *Vil.*				20						
Orangeville *Vil.*			1							
Bazetta *Tp.*	7				4			2		
Braceville *Tp.*						1				
Howland *Tp.*		1								
Johnston *Tp.*	2					1				

COMMUNICABLE DISEASES, JANUARY, 1915—Continued.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.		Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
TRUMBULL COUNTY—Concluded.											
Liberty	*Tp.*						3				
Lordstown	*Tp.*	3			1						
Mesopotamia	*Tp.*					1					
Newton	*Tp.*								1		
Mecca	*Tp.*								1		
Southington	*Tp.*					1					
Vienna	*Tp.*	1									
TUSCARAWAS COUNTY—											
Canal Dover			8				5				
New Philadelphia			1				2				
Bolivar	*Vil.*	1									
Dennison	*Vil.*		2			2					
Newcomerstown	*Vil.*						9				
Strasburg	*Vil.*					4	2				
Auburn	*Tp.*					1	11				
Dover	*Tp.*						2				
Fairfield	*Tp.*			2							
Goshen	*Tp.*						2				
Lawrence	*Tp.*	4							1		
Mill	*Tp.*								1		
Oxford	*Tp.*						1				
Sandy	*Tp.*			1					1		
UNION COUNTY—											
Marysville	*Vil.*						8				
Allen	*Tp.*						4		2		
Darby	*Tp.*					1					
Jackson	*Tp.*	4									
Jerome	*Tp.*					1					
Liberty	*Tp.*	2				1	5		1		2
Union	*Tp.*						8				
Washington	*Tp.*						6				
York	*Tp.*						4				
VAN WERT COUNTY—											
Van Wert				36							
Ohio City	*Vil.*						3				
Venedocia	*Vil.*	8		12							
Willshire	*Vil.*								1		
Harrison	*Tp.*			11							
Jackson	*Tp.*	1									
Liberty	*Tp.*			1			1				
Ridge	*Tp.*			1							
York	*Tp.*	10		28	1						
VINTON COUNTY—											
McArthur	*Vil.*						1				
Wilkesville	*Vil.*				10						
Brown	*Tp.*						1				
Knox	*Tp.*			7						1	
Wilkesville	*Tp.*				9						
WARREN COUNTY—											
Franklin	*Vil.*		6								
Lebanon	*Vil.*	12		1	30	2			2		3
Maineville	*Vil.*		2	3		1					
Morrow	*Vil.*						1				
Waynesville	*Vil.*	2		30							
Clear Creek	*Tp.*						1				
Turtle Creek	*Tp.*	5			4		1			1	
Washington	*Tp.*					1	2				
Wayne	*Tp.*			33							
WASHINGTON COUNTY—											
Marietta			2				1				
Belpre	*Vil.*									1	
New Matamoras	*Vil.*			2							
Adams	*Tp.*	2					2				
Belpre	*Tp.*		1								

COMMUNICABLE DISEASES, JANUARY, 1915—Concluded.

This table records cases reported to the State Board of Health for the month of January, 1915.

Health District.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Pneumonia.	Scarlet Fever.	Smallpox.	Tuberculosis.	Typhoid Fever.	Whooping Cough.
WASHINGTON COUNTY—Concluded.										
Decatur Tp.		1	4		1			1	1	
Warren Tp.	2									
Watertown Tp.					1					
Wesley Tp.			4							
WAYNE COUNTY—										
Wooster	21					10	6	2	1	
Bloomington Vil.						1				
Burbank Vil.							1			
Congress Vil.	1							1		
Dalton Vil.	30				2					
Orrville Vil.	*a*				2			1		
Shreve Vil.	1									
Baughman Tp.					1					2
Chester Tp.							2		1	
Chippewa Tp.			23							
Congress Tp.							1			
East Union Tp.						1				
Franklin Tp.						2				
Green Tp.	4					2				
Plain Tp.							14			
Salt Creek Tp.					3					
Wayne Tp.							2			
WILLIAMS COUNTY—										
Montpelier Vil.					1					
Stryker Vil.			3							
West Unity Vil.			1					1		
Brady Tp.			10							
Bridgewater Tp.	2		1							5
Center Tp.	10		22	4	3	1		4	3	7
Springfield Tp.										5
Superior Tp.										7
WOOD COUNTY—										
Bloomdale Vil.									1	
Bradner Vil.						2				
Hoytville Vil.					1					10
Freedom Tp.								2		
Henry Tp.						19	2			
Liberty Tp.		1	1			1				
Ross Tp.								1		
Washington Tp.	10									
WYANDOT COUNTY—										
Carey Vil.		6				1				
Nevada Vil.							11			
Upper Sandusky Vil.	18							1	2	
Wharton Vil.								1		
Jackson Tp.						5	1			
Marseilles Tp.							6			
Pitt Tp.								1		
Richland Tp.					2					
Tymochtee Tp.	1									

a Presence of disease reported but number of cases not specified.

NUMBER AND DISTRIBUTION BY COUNTIES OF REPORTED CASES OF COMMUNICABLE DISEASES NOT INCLUDED IN THE GENERAL TABLE. JANUARY, 1915.

County.	Gonorrhea.	German Measles.	Epidemic Cerebro-spinal Meningitis.	Ophthalmia Neonatorum.	Acute Anterior Poliomyelitis.	Syphilis.	Trachoma.
Ashtabula	1						
Athens	3						
Auglaize	4						2
Brown	1					1	
Butler	2					1	
Carroll	1						
Champaign	1						1
Clark	1			1			3
Clermont	3	2					
Clinton	1						
Columbiana		4					
Cuyahoga	1		4	54		2	2
Darke		1					
Defiance		4					
Delaware	2						
Fairfield	1						
Fayette	7					3	
Franklin	3			4			
Fulton	1	1				1	
Gallia	6					1	
Greene	10	1		1			
Guernsey	5						
Hamilton	2	2	5	2			2
Hardin	3		1				
Harrison	1						
Henry		2					2
Highland		8					
Holmes	1						
Huron					2		
Jefferson	3						
Knox	1						
Lake		1					
Licking	2				1		
Logan	1	2	1		1	2	
Lorain	3	1				2	
Lucas	1			6			
Madison	4						
Mahoning	1	7		2			4
Medina	1						
Meigs	3						
Mercer	5			2			1
Morgan	1						
Morrow	1	3					
Muskingum	3						
Paulding		1					
Perry	11						
Pickaway	1	5					
Portage	12					2	
Preble	2						
Putnam	7	15		1			
Richland	5		2			3	
Ross	3					1	
Sandusky	4						
Scioto						1	
Seneca	2						
Shelby		1					
Stark	3	30					
Summit				3			
Trumbull	1		1	1			1
Tuscarawas			1				
Union	1						
Van Wert	4					1	
Warren	5					2	
Washington	8					1	
Wayne	2						
Wyandot	1						

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SECRETARY AND EXECUTIVE OFFICER

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OHIO STATE BOARD OF HEALTH

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THE TUBERCULOSIS PROBLEM.

J. H. Landis, M. D.
Health Officer, Cincinnati, Ohio.

The control of tuberculosis is the giant problem in preventive medicine. Numerous predisposing causes conspire to maintain the army of susceptibles at full strength, and numerous other conditions combine to bring that army under the influence of the disease.

It is Nature's favorite method of removing the unfit.

For the ten years ending December 31, 1912, it caused 9,741 deaths in Cincinnati. The lowest record was in 1903, with 866 deaths; the highest in 1909, with 1,047. If the vital statistics of 1903 are accurate, our tuberculosis death rate for 1912 shows a slight increase over that year. During this period, large sums of money have been expended in material relief.

No sanitary problem is solved by caring for its victims; it is solved by eliminating the conditions creating the problem. Our typhoid problem was not solved by building larger and better hospitals; it was solved by purifying a polluted water supply. When that was done, the cause was removed, and the result ceased to exist.

Three important factors combine to render the control of tuberculosis so difficult of solution.

The public has become callous to its presence. Its average duration of nearly three years robs it of the dramatic quality which accompanies the rapidly fatal acute infections. The yearly toll of nearly one thouasnd victims in Cincinnati does not create as much concern as would the report of a single case of cholera or the plague.

Tuberculosis is always with us. It toys with its victim, completes its journey by easy stages, and is as much a part and parcel of some households as are old pieces of furniture.

The acute infections strike like lightning, last but a season, and may not return for years. It is the element of furious assault and sudden death that first paralyzes a community and then galvanizes it into action.

The element of chronicity, therefore, is one of the greatest handicaps to the early solution of the tuberculosis problem and works in various ways.

Almost anyone can be depended upon to make a short fight, but it requires all of the enthusiasm of a crusader to meet the varying conditions which arise over a period of years.

Many people who are willing to do everything necessary to control the disease fail because of lack of exact knowledge.

The prevention of tuberculosis calls for as careful an application of exact knowledge as does the preparation of the surroundings and body of a patient for a surgical operation. In fact, in point of time consumed, the proper care of a surgical case is in the kindergarten class of preventive medicine when compared to one of tuberculosis.

The chronic course of the disease is a powerful factor in preventing the passage and enforcement of adequate laws for its control. How quickly the proper machinery would be supplied if tuberculosis struck like cholera! Yet tuberculosis moves to the inevitable end much more surely than does cholera. One is like the transient fury of a broken dam; the other moves with the deliberation of an advancing glacier.

During all this time the victim is actively infectious, a constant menace to those who, by reason of employment or home environment, are more or less in direct, prolonged, personal contact.

The general apathy towards this disease, in contrast to the attitude of the public for the acute infections, can only be explained because of its chronicity.

Several years ago the Ninth Ward had a localized outbreak of scarlet fever. As a result of this outbreak, mothers' clubs, improvement associations, and school and health officials were kept in a ferment; one dairy had every move in the distribution of its supply under the eye of a food inspector, and one institution with a population of about one hundred and fifty, had its activities paralyzed by quarantine. Yet, during that year, where the ward's losses by deaths due to scarlet fever were three, its losses due to tuberculosis were nineteen, and not a whisper in the way of protest was heard. If diphtheria, infantile paralysis, or spotted fever appears in a neighborhood, it immediately develops a localized panic, and yet during the year where these causes combined caused a total death loss to the city of 105, tuberculosis claimed 968.

People are beginning to have a wholesome respect for typhoid fever and the danger of infection through contact with patients, and yet during the same period where typhoid caused one death in Cincinnati, tuberculosis caused 34.

We have inherited a fear of smallpox that has been handed down through the centuries, an instinctive fear born during the prevalence of the devastating epidemics before vaccination was discovered, and yet during the past ten years where smallpox has caused one death in Cincinnati, tuberculosis has caused 250. One case of this disease can be productive of more general alarm in a community than all of the cases of tuberculosis combined, and yet one's chances of dying of smallpox, when compared to tuberculosis, are so remote that they are not worth considering.

The second reason why the disease is difficult to control is because of the large army of recruits rendered susceptible by reason of the various agencies which are classified as predisposing causes, and which include forms of dissipation, occupation, and bad housing conditions.

All forms of dissipation contribute an eligible list for tuberculosis. Alcoholism leads because of the widespread prevalence of this form of dissipation. By reducing resistance, it makes bacterial invasion easy, and, by continuing this lowered resistance over long periods of time, it makes it rapid. It is so intimately bound up with the bad housing problem that it will be considered more fully under that subject.

Workers in shops and factories are at an initial disadvantage because compelled to labor under conditions which necessarily deprive them of a normal amount of air and sunlight, the two essentials in the prevention as well as the cure of this disease. Add to these the irritating effects of certain dusty atmospheres or the vicious influence of chronic poisoning due to materials worked with, such as lead or mercury, and we have produced a lowered resistance which makes infection easy.

In one industry, for example, in which the Cincinnati Department of Health carried on an investigation, it was shown that thirty of forty-two deaths occurring in one union during a period of six years were caused by tuberculosis.

Any industry, employment in which practically sentences over 70 per cent. of its workmen to death from tuberculosis, must have conditions present which demand correction.

In this investigation it was not possible to analyze all of the cases, but the investigation disclosed conditions which are recognized as contributing factors. Among these may be mentioned bad air, poor toilet facilities, lack of natural light, dust due to dry sweeping during working hours, common drinking cups, spitting on the floor, and handling articles manufactured in such a way as to bring them in contact, one after another, with the mouths of the workmen. All of these conditions are not present in any one factory, with the possible exception of the last, which is the most dangerous of all, and in some nearly all of them are absent.

Many unsanitary practices are the fault of the employes and are persisted in contrary to the orders of the employer.

For example, in some instances where spittoons were provided certain employes persisted in spitting about the floor. In cases of this kind, the other employes should be able to exert enough pressure to stop the practice. It has been the policy of the Health Department to make arrests and prosecute such cases in Police Court.

The use of a common drinking cup on a floor with one tuberculous case present is a menace to all of the people on that floor.

Practically the same condition prevails in dairies where liquid food is emptied at one end in a trough and by gravity reaches all of the animals feeding from that trough. In such dairies, it is the rule to find a large proportion of the animals infected if there is one advanced case present. In one dairy, with a trough accommodating nine cows, and with an advanced case at the head of the row, all others were found infected.

In one office four young clerks came down, one after another, with tuberculosis and died. In the office force was an old clerk with a chronic cough, who expectorated on the floor and who, presumably, used the same drinking cup.

Similarly three young women stenographers died of the disease, one after the other, all being employed in turn in the office of an attorney with a chronic cough and presumably using the same drinking cup.

The indifference of some employers to the state of health of the human machine they use contributes to this problem. And right here is one of the keys to the situation, for the close contact in offices, workshops and factories is second only to contact in the home as a method of dissemination.

The doctor gets the case after the damage has been done. To be of any particular value, in preventing its spread, the work of the physician must undergo a radical change. Preventive medicine is to replace to a large extent curative medicine. Business men are about ripe for the change. Their success depends upon an efficient working force. Other things being equal, one firm will succeed with its average workman in good health where a rival will fail because its average workman is in bad health.

Medical inspection of employes in workshops and factories is of as much importance as is the medical inspection of school children. Every factory would be benefited by having a physician to regulate sanitary conditions in that factory. He is as necessary to the success of a business as is a superintendent and can do much to add to its profits. His function would be to eliminate every condition detrimental to the health of the employes, and this would include the detection and exclusion of tuberculous individuals.

Bad housing conditions have been seized upon by many as one of the chief factors in the spread of the disease. Social investigators find numerous cases in mean surroundings and too often jump at the conclusion that the whole trouble can be charged to bad tenements. They fail to differentiate between cause and effect, and thus it comes about that landlords in general—the good, bad and the indifferent—find themselves the storm center of a social uplift movement and being used as human punching-bags by the enthusiastic social worker.

That intolerable conditions exist in tenement houses, no one will deny; that they are all due to the landlord's rapacity is not true, and that they can be entirely eradicated by improved tenements is absurd!

You cannot transform a hog into a gentleman by transporting him from a pig-sty to a parlor; neither can you transform an undesirable tenant into a desirable one by transporting him from a bad tenement to a good one.

Tenements which do not conform with the building code, while contributing their share to the spread of tuberculosis, do so as a rule only after other factors have laid the foundation. The tuberculosis problem will still press for solution long after the model tenement has become a fact. Model tenements, while assisting in solving the problem, do not solve the problem of securing model tenants.

It is customary to charge bad tenements with being breeders of crime, dissipation and vice. While their influence is bad, they are a result of them rather than the cause of them. When once established, they work in a vicious circle and, like the brook, "go on forever."

The tuberculosis survey made in our tuberculosis centers disclosed some very interesting facts. One of the most interesting was the large proportion of the weekly wage expended for alcohol. In many instances the sum thus spent added to the rent paid would have solved the problem of proper tenements. Money spent for alcohol curtails the amount left to spend for the necessaries and, in proportion as one pays out money for liquor, so does his earning power for any purpose deteriorate.

The slum is logically the last place of abode for the dissipated individual. It did not create him; he created it, and he feeds it with his offspring. Into this region drift a large number of negroes, many of them honest, industrious and sober, and a considerable number of immigrants. The negroes go there because all other places are closed against them. The immigrant, because he knows no better and no one seems to care what becomes of him. The second generation of both classes furnishes a considerable proportion of the criminals, alcoholics and prostitutes who fill our penal institutions and hospitals, and a large proportion of the dependent children found in public and private charities.

As the slum is the logical last place of abode of the dissipated individual, so is the tuberculous route the logical one traveled until he reaches his final destination.

Hunger, cold, poor food, bad air, lack of sunshine, defective plumbing and overcrowding, fertilize a soil in which tuberculosis thrives and, during the average duration of two years and eleven months, the victim handles your food, poisons the cup from which you drink, contaminates the air you breathe, makes the clothes you wear, coughs in your face in the street cars, shells a considerable proportion of the nuts you eat, adds to your burden of taxation, and in one or all of these ways claims his "pound of flesh."

As long as society makes it easy for people to become criminal, vicious or dissipated, just so long will we see the result in districts where these people predominate.

The constitution guarantees to every man life, liberty and the pursuit of happiness, but we tolerate conditions, the end-results of which rob him of life, deprive him of liberty when he exercises it, and leave him so far behind in the pursuit of happiness that that elusive condition is unaware of ever having been chased.

Better tenements will do untold good in providing better homes for deserving tenants. They will not transform the criminal into a law-abiding citizen, or the alcoholic into a total abstainer, or the vicious individual into a virtuous one, but they will make it possible for a man of moderate means to raise a family outside the influence of the vicious circle.

If all the shacks in a city could be transformed into model tenements over night, the factors making undesirable tenants possible would be working just the same.

Many tenants living in bad tenements are innocent of any offense, moral or otherwise. Let this point be illustrated by examples:

A worker with machinery loses a hand or an arm, because safety devices have not been used to protect him from danger. His income ceases until he is fully convalescent, and from that time on he is a handicapped worker. His income suffers accordingly; he has less money to spend for necessaries, including rent. He wears cheaper clothing, eats cheaper food, lives in a cheaper home. Is the landlord to blame for this man's plight? Would an expenditure of money, placing this man's tenement in better sanitary condition, solve his problem? Who pays for improved tenement house conditions, the tenant or the landlord? If you are living in a house without city water, gas or electric fittings, or plumbing, and all of these are installed, does your rent remain stationary or does it go up? If it does go up and you are paying the last possible cent for rent, how are you benefited by the changes made? The responsibility for this man's condition rests between his employer and the state. The employer has failed to obey the law, and the state has failed to enforce it. The man is the innocent victim of a combination of greed and lax enforcement of law. He is found in a bad tenement, and it is charged with his troubles.

Another example: A workman is exposed to irritating dust in some trade. After a time he develops chronic bronchitis and later tuberculosis of the lungs. His efficiency fails, and his income suffers; cheaper quarters are sought, and primitive sanitary conditions almost necessarily go with them. Is the landlord to blame? Improvements in these apartments mean higher rent, a condition from which the worker has just made his escape. Will the man's problem be solved by offering him quarters absolutely beyond his means? Efficient blower systems protect workmen from irritating dusts and are an insurance against tuberculosis. State laws prescribe how they shall be installed and provide the machinery to enforce the law. Some employers refuse to install them, and the state neglects to enforce them. Shall the landlord be held responsible for this victim of greed and neglect?

Still another example: A man is in the third stage of pulmonary tuberculosis. He studiously ignores advice from the Anti-Tuberculosis Leauge nurse and, by expectorating on the walls, floor, bedclothing and straight up in the air, transforms what might have been fairly decent quarters into a miniature pestilential hell. To all protests, he replies, "This woman is *my* wife, and these are *my* children. I'll give them consumption if I choose to do so."

Three city solicitors have ruled that tuberculous patients of the vicious type described may be removed forcibly by the Health Department and forcibly detained in a quarantine hospital. What happens when we remove one of these patients? He makes himself so obnoxious in a general ward that he is discharged from the institution, and forcible detention is impossible because no strong ward has been provided. Is the landlord to blame for the bad sanitary conditions surrounding this man's family?

A landlord provides bath tubs and flush closets. In some few instances a little later on, an inspection shows the bath tub full of coal and the flush closet chocked with ashes, garbage, human filth, broken bottles, and other waste material. Is the landlord to blame?

Examples could be multiplied tending to demonstrate that this question, like all others, has two sides.

Improved sanitary conditions do not necessarily follow improved tenement conditions. The sanitary condition of a flat with a choked flush toilet, as has been described, is infinitely worse than one with a primitive privy vault or catch basin in the yard.

What has been said is not for the purpose of discouraging attempts to improve tenement conditions, but to direct attention to the other side of the question, and to impress upon investigators the fact that they are dealing in many instances with end-results.

Any attempt at improvement must follow a practical plan. That thousands are deserving of better quarters admits of no argument. The colored race is being mercilessly exploited, but the time has passed when all of our ills can be charged to the bad tenement. Very often it is merely an incident in the life history of the tuberculous poor, one of the way stations on their journey to the grave.

The third reason is to be sought in our failure to quarantine actively infectious cases.

The spread of tuberculosis will never be controlled until the same quarantine principles are applied which have proven effective in the acute infections. It is really of greater importance in tuberculosis than in the acute infections, because of the prolonged contact and because a much greater proportion of contacts contract the disease.

Preventive measures against the acute infections are successful because they are radical and are backed by public sentiment. The same drastic methods employed against tuberculosis would lead probably to the same brilliant results. The reasons why a typhoid patient should not be permitted to pollute water and food supplies apply with equal force to the tuberculous individual in his contact with the public.

The present method of handling tuberculous cases, from a preventive medicine point of view, is on a par with our typhoid situation before the construction of the new water works. Economically it has the story of Frenzied Finance in the nursery-tale class of literature. Accepting the estimate of the Committee of One Hundred on "Conservation" as correct, Cincinnati's economic loss from this one disease during the year 1912 was $4,835,000 and for the last decade $48,725,000, a sum sufficient to have built the Southern Road, the new water works, and a complete modern sewerage system. The annual economic loss is sufficient to pay all of the dividends of the Union Gas

& Electric Co., the Telephone Co., the Traction Co., our water bills, and leave about $600,000 for incidentals.

If the conclusions in this paper are correct, what methods should be adopted to solve the problem?

Five per cent. of the total number of cases being of the bovine type calls for the passage and rigid enforcement of laws providing for the tuberculin test of all dairy cattle or the pasteurization of all milk. Even these precautions will be of little value unless both methods are under strict supervision of the Health Department. What is known as "plugging" before the tuberculin test is made will prevent reaction in a diseased animal, and few dairymen have sufficient training to operate a pasteurizer properly.

The ideal method would be to have a central pasteurizing station, in which the milk of a municipality could be pasteurized under the direct supervision of the Health Department, regardless of whether or not the tuberculin test had been made. This would also eliminate the other milk-borne infections.

Proprietors of workshops and factories should be compelled to conform to state laws concerning sanitary conditions and protect workers from dangerous machines and irritating dusts.

Applicants for employment in workshops and factories should successfully pass a physical examination before they are employed.

Regular medical inspection should be adopted so that actively infectious cases may be given the benefit of treatment at a time when cure is possible and other healthy employes may be protected from infection. No one now questions the wisdom of medical school inspection. Medical inspection of workshops and factories would give the same protection to adults that medical school inspection does to children.

Our ideas concerning the personal liberty of the individual to cultivate alcoholism needs a radical revision. Fortunately, the problem is being worked out along economic lines, and taxpayers are wanting to know just what they get in return for supporting the army of diseased, dependent and delinquent due to this cause. As long as the chief cause exists, just so long will the end-results continue to plague society.

Our method of carefully excluding undesirable immigrants at ports of entry and then furnishing every facility for the transformation of good immigrants into bad ones adds to our tuberculosis problem and has no trace of that Solomanic wisdom which is popularly believed to tincture all of our policies.

The work of the United Jewish Charities in Cincinnati looking after newly arrived members of their race might well serve as a model for handling all classes of aliens desiring to become citizens.

Our policy of indifference to what becomes of the colored citizen makes him, in this state, four times the problem in the tuberculosis situation presented by the average white citizen, for the mortality rate from tuberculosis is 400 per cent. greater in the negro than in the white.

Quarantine must be maintained if chains of infection are to be broken, and the breaking of these chains is absolutely necessary if the disease is to be controlled.

The control of tuberculosis means the expenditure of large sums of money, but the economic saving will pay golden dividends.

Every large city with a tuberculosis problem should go to work to solve it on a scale in harmony with the magnitude of the problem. One-sixth of the annual economic loss would probably be sufficient to do the work. It could be used in three ways:

1. For segregation and maintenance of incurables.
2. For segregation, maintenance and cure of those in the first and second stages.
3. For the support of the families of those breadwinners undergoing treatment.

These three things are essential to make appreciable inroads on the disease. It is well known that third stage cases are especially dangerous to those in prolonged contact with them. It is equally well known that first and second stage cases rapidly develop into second and third stage cases if they continue in their employment. The great majority of them are compelled to continue to work because they are the breadwinners and constitute the last line of defense between their families and absolute want.

It is difficult to conceive of a combination of circumstances presenting in a greater degree the elements of the tragic and the heroic than can be found in a home where the great white plague has marked the breadwinner for death.

Isn't the time about ripe for the general public to place this problem on a cold-blooded business basis?

Cincinnati's problem is not unique, although it seems to be a little more unique than that of other cities over the country. The building of a tuberculosis hospital, about fifteen years ago, complicated rather than simplified her problem, for that city became a mecca for the tuberculous poor of West Virginia, Kentucky, Tennessee, and other contiguous parts of Ohio and Indiana. Since the completion of that hospital, hundreds of hopelessly advanced cases have arrived in that city to become a menace to the general public, a burden to the taxpayers, and to furnish a considerable number of the deaths necessary to place that city at the head of the mortality tables from this cause.

It is to be expected that any radical plan will meet with opposition, and nothing short of a radical plan will accomplish the desired result.

The guardians of the constitution may be expected to give evidence of great mental anguish and draw a vivid word picture of Liberty dying in the midst of the most horrible agony. In comparison, the vocal exhibition given by this popular Goddess at the time when Kosciusco fell may be expected to degenerate into a cradle song. Skeleton hands of dead jurists will reach forth from innumerable graveyards to block the wheels of progress with century-old precedents. Fortunately the people of Ohio have arrived at the point where they no longer reverence a constitution which obstructs rather than helps advancement.

Tuberculosis is present in epidemic form in practically every large city in this country. If radical methods to suppress it can only be placed in operation by so declaring it, then let the declaration be made.

If the constitution stands in the way, then let us change that venerable instrument! Let us set aside bad, old precedents and establish good, new ones! Let us go out from under the dominion of the graveyard!

DANGER OF POLLUTING THE PUBLIC WATER SUPPLY BY INDUSTRIAL CONNECTIONS.

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In recent years much has been written and said concerning the problems involved in the securing of a safe water supply, including the development of the source and precautions necessary to protect the quality of the supply. Much good has been accomplished and a large number of communities within the state are enjoying at the present time the advantages incident to the use of a pure and wholesome public water supply. It is true, of course, that a relatively small number of villages and a few cities have been slow in the installation of suitable supplies and are provided with water of such character that it is not used for domestic or drinking purposes. In those communities where the supply is of good sanitary quality, however, there is an ever increasing number of persons who depend entirely upon the supply for all purposes, including drinking and general domestic uses.

Occasionally in localities where the public water supply is of good quality there occurs an epidemic of typhoid fever. A careful epidemiological study reveals the facts that the milk supply is not used in common, that the sanitary conditions are good, that private wells are not used and that the only source common to all is the public water supply. But the source of the supply is satisfactory and analyses of samples of the water have shown it to be free from pathogenic bacteria of the colon group. From what source then does the infection come? In a number of cases it has been traced to industrial connections at factories and shops, maintaining for their private use polluted water supplies. It is desired to bring this source of infection to the attention of those interested in public health work in order that they may realize the danger incident to such connections so that they will take the necessary steps to protect their people against typhoid fever by insisting that it be made impossible to introduce an impure water into the distributing system, through such a connection or from any other source.

With the development of the villages and cities of the state due to the installation of new factories there has been a gradual increase in the number of industrial connections. In many instances but one source of supply is used, and the city water is utilized for fire protection as well as for general manufacturing processes. In the larger plants in order to reduce insurance rates it is often found advisable to install a secondary supply. The source of this supply depends, of course, upon the location of the plant, but is generally taken from some river, creek, lake, pond or hydraulic or transportation canal which source may or may not be seriously polluted, but certainly is of such characteristics as to be unsuitable for drinking purposes and should not be discharged either into the city mains or to the private main supplying drinking water within the factory. The saving to the factory on the double water supply is from 33 1-3% to 50% of the premium on the fire risk and, in fact, some companies will not insure a factory which is not provided with two sources of supply. It will be seen, therefore, that the larger industrial plants are greatly in need of the two supplies. If two sources are provided it is evident that where only one system of piping has been installed, there must be some point where the pure city supply and the impure factory supply must be connected. Therein lies the danger.

Many superintendents of water works when confronted with the proposition state that it is impossible for any of the polluted supply to enter the city mains owing to the fact that a gate valve is provided, which is kept closed, and also that the city pressure is higher than that maintained by the factory. They fail to realize that gate valves may leak or that the city pressure may be lowered due to a break or heavy consumption or that the factory fire pumps are tested frequently by inspectors from fire underwriters at which times the pressure on the factory side may be considerably higher than that on the city side.

EXPERIENCE WITH INDUSTRIAL CONNECTIONS.

An epidemic of typhoid fever occurred in Van Wert, Ohio, in December 1913, which was traced to an industrial connection at the Cincinnati Northern Railroad shops. On Saturday, November 15, 1913, the pumps at the pumping station of the Van Wert water supply were stopped and were not started again until Sunday afternoon, November 16, 1913. From Monday until Wednesday of that week enteritis was epidemic in all parts of the city, between 500 and 600 cases being reported. On December 1, 1913, an outbreak of typhoid fever occurred. No typhoid fever had been reported during November 1913. The incidence of the disease was sudden. During the first two weeks of December, twenty cases and one death were reported and in the second half of the month eight additional cases with one death. During January, 1914, there were five cases with one death with the following month entirely free from typhoid. Careful studies of the outbreak were made by the local board of health and by representatives of the Ohio State Board of Health. The report upon the investigations showed that the public water supply which was obtained from deep wells was safe for domestic uses, and that it was not probable that it could be the source of infection. It was ascertained that the Cincinnti Northern Railroad Company maintained a connection between their private supply and the city water main. The private supply is obtained from Town Creek below the city, through which it passes. The creek receives the sewage from about fifty outlets, thereby being seriously polluted. The Cincinnati Northern Railroad maintains two pumps, one pumping against a pressure of 110 pounds and the other to a tank against twenty-five pounds. The city pressure is sixty-five pounds. A single gate valve is placed on the line between the city supply and the discharge side of the pump, working against the pressure of 110 pounds. The city main discharges into an elevated tank, owned by the railroad. It is well established by the facts as observed that the water from Town Creek pumped by the railroad company was discharged from the tank to the city mains, this being made possible by the lowered pressure on the distributing system, resulting from the temporary interruption of pumping. This permitted the supply to be contaminated, thereby causing the epidemic which resulted. The necessity for the correction of the existing conditions was evident and the connection between the two supplies was discontinued. The city main now discharges to the elevated tank in such a manner as to make it impossible for the tank to drain into the city mains.

The liability of a single gate valve to leak, thereby endangering the quality of a public water supply has long been realized and many attempts have been made to use check valves in combination with gate valves. This arrangement has not proved to be an entirely safe proposition. One of the best examples and one close to home is the typhoid epidemic at Circleville, which occurred during January and February 1914. In this case a careful study by the local board of health and representatives of the Ohio State Board of Health determined that the source of the infection must be the public water supply. The public water supply which is owned by a private company is obtained from a horizontal well which is located near Big Darby Creek. Examinations made at different times by the Ohio State Board of Health previous to the outbreak indicated that the water supply was safe. Analyses of the water at the time of the outbreak confirmed those results previously obtained. The forty-three cases included in the outbreak were with one exception in the southerly half of the city. Three deaths were reported. No satisfactory explanation was found until January 31, 1914, at which time the local board of health learned of a connection between the city water mains and the private supply of the American Straw Board Company, located in the southwesterly portion of the city. The straw board company maintains an intake to the Scioto River, which stream is grossly polluted by the sewage from Columbus, located on the Scioto River twenty-five miles above Circleville. The private supply is used for industrial purposes and for fire protection. The city water enters the private system through a check valve and gives added fire protection. Frequently the pressure of the private supply exceeds that of the city supply and the check valve was installed in order to prevent the entrance of the polluted water into the city mains. In addition to the check, two gate valves, one on either side of the check are provided. Both of these vales were open and when the connection was examined it was found that the check valve was leaking badly. The valve was removed and repaired and the gate valve on the polluted side was tightly closed. The outbreak was sudden both in onset and decline. The distribution in the southern portion of the city showed no peculiar grouping and all other possible sources other than the public water supply were eliminated. It is interesting at this time to note that a suit has been filed in the Pickaway County courts against the Circleville Water Company by a man whose wife contracted typhoid fever and died. The suit is in the courts at the present time. A complete report of the outbreak at Circleville may be found in the Monthly Bulletin of the Ohio State Board of Health for July 1914.[1]

In 1903 at New Bedford,[2] Massachusetts, trouble was experienced due to leaking check valves. A fire occurred at one of the large mills provided with a private water supply of salt water. The salt water pumped by the fire pumps at the mill passed through leaking check valves to the city mains. Such a large amount of this water reached the mains that it entirely disabled the fire steamers of the city, which were assisting at the fire. If the mill supply had been fresh water the leaking valves would not have been detected and with a polluted supply the damage that might have been done is impossible to estimate. In New Bedford periodical inspections of all connections between private supplies and the public water supply are made. Such an inspection occasionally reveals a case where a check is not in operation.

In 1911 a small outbreak of typhoid fever occurred in Springfield, Ohio.[3] Many of the cases were found among the employes of the International Harvester Company. It was ascertained that this company had access to two supplies, one obtained from the city and the other from a small creek. The two supplies were separated only by a gate valve with the polluted water at a higher pressure than the city supply. A study of the situation led to the conclusion that the polluted creek water passed through the gate valve, entered the mains which were supposed to contain only city water which supply was used for drinking purposes by the employes, thereby causing the infection.

A similar case was observed in Toronto, Ontario, where check valves supplying an office building failed to operate. In the same city a small connection installed by an employe of an industrial establishment between the public water supply and a polluted supply so contaminated the public water supply that an epidemic of typhoid fever resulted.

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[1] By W. H. Dittoe, Director Division of Sanitary Engineering, and Frank G. Boudreau, Director Division of Communicable Diseases, Ohio State Board of Health.

[2] R. C. P. Goggeshall, Journal of the New England Water Association, 1903, page 69.

[3] Annual Report Ohio State Board of Health, 1911, page 469.

In 1913 the Bureau of Health of Philadelphia,[4] investigated a typhoid epidemic which it was found had been caused by the pollution of the city water by industrial connections. Intermittent contamination appeared in the city mains, which upon investigaton was found to be due to what are termed 'Dual Water Systems," that is, piping systems which could alternately receive water from the ciy main and water from some other source, as for example from Frankford Creek or the Delaware and Schuylkill Rivers through the private pumping plants. Check valves were found to be in the piping systems but in many cases they failed to operate properly. Absolute separation of all such systems was required and no future installations of this type were permitted. The result was that the intermittent contamination disappeared from the city mains. Mr. Carleton E. Davis[5] mentions the increase in the typhoid rate for Philadelphia during April and May 1913. The larger number of cases were confined to the district along the Delaware water front. This district is supplied with filtered water which is also furnished to other portions of the city which were entirely free from typhoid.

When industrial connections are installed it is very frequently found that the gate valves as well as any check valves which may have been installed are covered and within a short time the exact location of the same is not known. This condition existed in Auburn, N. Y.[5] An examination of all of the connections in Auburn revealed the fact that many of the check valves were leaking and that the polluted water from the private supplies was being forced into the city mains. An attempt was made to prevent any connection between the two supplies. This was met with strong opposition by both the insurance men and the factory owners. Duplicate check valves of an improved type were then installed. These are placed in suitable chambers and regularly inspected. A description of the so-called sanitary check valve together with the method employed in testing the same is given in a paper by Mr. J. Walter Ackerman, Chief Engineer and Superintendent of Water Works at Auburn, N. Y., appearing in the Journal of the American Water Works Association, for 1914, page 90.

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[4] Journal of the American Water Works Association, 1913, page 169. Joseph F. Neff, M. D. Paper before American Public Health Association, September, 1913. Not yet printed.

Annual Report of the Bureau of Health, Philadelphia, 1913, pp. 116 and 308.

[5] J. Walter Ackerman, Chief Engineer and Superintendent of Water Works, Auburn, N. Y. Journal of the American Water Works Association, 1913, page 162.

Pollution of City Water Through Check Valves on Private Fire Protection. Plants—J. Walter Ackerman—Municipal Engineering, November, 1910.

Mr. H. E. Jordan,[6] Superintendent of Filtration, Indianapolis Water Company, points out the reasons for the installation of the private supply and the methods generally in use in connecting the private supply to the city mains. Three instances of the danger of cross connected systems are mentioned. The first which has no sanitary significance excepting indirectly, is that of an establishment which used unpurified canal water. The canal was drained for repairs and while such were being made the city water was furnished to the plant. When the repairs were completed, the valve to the canal was opened, but the city supply was not shut off. The result was, that the city water which was of high pressure not only supplied the plant but also flowed through the open valve and wasted to the canal. Similar instances might be cited where the negligence of employes in leaving valves open had the opposite result, in that the polluted supply was forced into the city mains.

Another case was that of a connection in a western city. The connection between the private and public supplies was provided with two valves, both of which were to be closed excepting at such times as the city water was being used. A water tank on the private system was used to receive fresh water as well as water from ammonia washers. It was thought that the city pressure was always above that of the private supply, but at times of heavy consumption such was not the case. The mixed water, therefore, passed into the city mains and freuent complaints as to the color and odor of the supply were received. Owing to the character of the pollution no serious results followed. Had the private supply been obtained from a polluted source typhoid probably would have resulted. The people, however, are entitled to a safe supply of water and one that is usable. A water having a high color and objectionable odor cannot be considered as satisfactory and a supply should be protected against such pollution.

In Winnipeg, Manitoba,[6] a cross connection between the fire service system and the domestic supply of the city caused an epidemic of typhoid. The connection was removed and the fever disappeared.

While repairing the pumps of a private water supply used in a certain building in Muncie, Ind.,[7] the city water was turned on. The contractor who was to make the repairs completed his work and desired to test the same. The open valve on the city main was forgotten, however, and the private supply was pumped into the main. A similar case was that of a private supply stored in reservoirs and used over and over. The water comes in contact with a product of manufacture and has a decided taste and odor. Owing to the fact that the valves connecting the private with the public water supply were not closed the consumers in the neighborhood of the plant received a water which had a high color and a decided taste and odor.

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[6] Danger of Physical Connections Between Public and Private Water Supply Systems—H. E. Jordan. Proceedings of the Indiana Sanitary and Water Supply Association, 1913, page 143.

[7] Proceedings of the Indiana Sanitary and Water Supply Association, 1913, page 146.

The Locks and Canals Company, of Lowell, Mass.,[8] maintains a private water supply obtained from a source which is seriously polluted. The supply was installed in order to provide fire protection to their mills. When the Lowell supply was installed the Locks and Canals Company secured several connections between their private supply and the city supply in order to secure more ample fire protection. Gate valves were placed on each end of the connecting pipes in order to protect the city supply. Originally it was proposed to keep the gate valves closed only opening them at times of fire. In order, however, to secure additional fire protection, check valves were installed so that the water would enter the private system automatically. The reservoir of the Locks and Canal Company was 35 feet higher than the city reservoir and it was thought that this would create sufficient pressure to keep the check valves closed excepting at time of fire, when the pressure would be reduced and the city water would then enter the private system, but in no case was it thought that it was possible for the private supply to enter the city main. In the 1903 report of the Lowell Water Board a description of what happened may be found. A fire occurred at the plant of the Locks and Canal Company. The pressure in the private system went below the city pressure and city water was, therefore furnished to the private system through the check valves until the fire was extinguished. Soon after the fire, the private pumps were started but normal pressure was not secured. After some time it was found that the check valves were leaking and that the polluted water was being forced into the city mains. The above condition had no significance to the Locks and Canals Company, and the local health officials and the water superintendent were not notified. Several days later the superintendent of the company casually informed the water works officials that the company had returned all the water they had used during the fire. When an explanation was demanded, the true facts as mentioned above were obtained. About one week previous to the date of the fire, the check valves had been removed and repaired and were supposedly in good working condition. During the repairs the gate valves on either side of the check were closed and were not opened by the water works company. At the time of the fire, however, an employe of the company opened both valves, and the pressure was not resumed in the private system until after the same employe had turned off the city water at the gate valve on the city side of the check. It is interesting to add that the check valve used was made especially for the Locks and Canals Company, was substantial and well constructed. The results were very serious. Statistics show that in 1901 there were but 15 cases of typhoid and 6 deaths. In 1902 13 cases and 1 death, while in 1903 during the months of August and September immediately following the fire there were 168 cases and 9 deaths. As soon as the conditions were ascertained the mains were blown out and the Massachusetts State Board of Health called in to examine the supply. Another result was the absolute and complete separation of the city mains from all other sources of supply and the passage of the following regulations which are still in force:[9]

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[8] How a Public Water Supply was Polluted by a Private Fire Service, and the Consequences. R. J. Thomas, Supt. Water Works, Lowell, Mass., Journal of the American Water Works Association, 1913, page 153. George Bowers, City Engineer, Lowell, Engineering News, Vol. 51, page 125.

"Preamble. No fire service pipe shall be laid into the premises of any corporation firm or individual having connected therewith, directly or indirectly, supplementary or secondary fire service consisting of fire pump, cistern, tank, standpipe or other apparatus, excepting where such fire pump, cistern, tank, standpipe, etc., are supplied with water from the city water works system and subject to the following regulations:

1. All water for fire service pipes shall be metered; meter to be furnished and set by city at the owner's expense. No charge shall be made, however, for water used exclusively for the extinguishing of fires.
2. All main pipes for fire services shall be furnished and connected by the city at the expense of the owner.
3. Where a standpipe, tank or cistern is used it shall be constructed in such a manner as to shield and protect the water from all possible pollution.
4. Provision shall be made in its construction for means of access to the interior of it by the superintendent or other agents of the water department for the purpose of inspection and so as to allow for its cleaning as required by the water department.
5. It shall also be fitted with a pipe for the purpose of drawing off all the water at such intervals as required by the water department.
6. Said drawoff pipe must not be connected with a sewer or drain in a way that might lead to the contamination of the water from such source.
7. All expenses not mentioned herein incurred on account of fire services

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[9] Journal American Water Works Association, 1913, page 157.

shall be borne by the corporation, firm or individual owning the protected premises; and,

8. The water board shall have the power from time to time to prescribe whatever other rules they may deem necessary."

Mr. R. J. Thomas of Lowell, Massachusetts, superintendent of water works, states that where the health and lives of the people are in danger, reliance should not be placed on any contrivance that operates either automaticaly or by hand. The safest plan is not to allow any connection directly or indirectly between the pipes of the public water supply and the pipes, tanks or pumps of the private fire service system containing a polluted water. Following the investigation of the local health department at Philadelphia, the board of health passed resolutions,[10] under date of June 20, 1913, as follows:

"WHEREAS, It has come to the knowledge of this Board that it is the practice in this city to install in certain instances water piping systems, whereby water from city mains and from other sources can be alternately used in such piping system; and,

"WHEREAS, It has been found that the city mains in localized sections are now subject to periodic contamination; and,

"WHEREAS, Systems of piping which possess the possibility of allowing contaminated water to enter the city's distribution system, have a tendency to be prejudicial to the public health; therefore,

Be it resolved, That an actual, physical severance shall be maintained between piping connected to the city mains, and piping carrying water from any other source and that the Director of the Department of Public Health and Charities is hereby authorized and directed to cause the severance of all such dual systems in use, and to prevent the construction of any future system of like character."

There was some divergence of opinion in Philadelphia as to the theory of the typhoid epidemic. Dr. W. H. Frost, of the United States Health Service, and Mr. F. Herbert Snow, chief engineer of the Pennsylvania department of health, reviewed the records and corroborated the findings of the local officials. The conclusion[11] reached was that the probable cause of at least 72% of the typhoid cases in Philadelphia was due to the pollution of the city service mains. A careful survey[12] of the city revealed 77 industrial connections. 63 of these connections were discontinued in 1913 and 14 were being disconnected at the beginning of 1914.

The Baltimore County Water & Electric Company of Baltimore

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[10] Annual Report Bureau of Health, Philadelphia, 1913, page 119.

[11] Annual Report Bureau of Health, Philadelphia, 1913, page 120.

[12] Annual Report Bureau of Health, Philadelphia, 1913, page 308.

County, Maryland,[13] provides the following agreement, which is entered into by the above named company and any applicant for private fire protection.

> "Any fire protection system supplied with water from the company's service shall be supplied exclusively with such water, and no connection will be allowed with any other system drawing its supply from any other source, whereby the company's water supply may be contaminated by the failure to close valves or leaking check valves, etc.; and no auxiliary or secondary suction pipe to any underwriter pump taking water from the harbor, streams or other source whatever will be permitted. Any fire protection system using water from the harbor, streams or other source than the company's service shall be kept separate from any such system supplied from the company's service."

OPINIONS REGARDING INDUSTRIAL CONNECTIONS.

In the above an attempt has been made to bring to your attention a few cases representing what may happen by the pollution of a public water supply by industrial connections. This does not represent by far all the towns where such conditions exist. For probably without exception in every town where a water supply is provided and also where there are one or more factories you will find the industrial connection. For example, Barberton, Hamilton, Middletown, Dayton, Martin's Ferry, West Carrollton and many others here in Ohio. Few health officials are familiar with these conditions in their own communities, not knowing whether they exist or not and few are familiar with the quality of private supplies which they know to exist. It is important that they should be fully informed and that where danger exists that they guard the city supply. The opinions given by a few water works men and engineers from various parts of the country will be given in order to call attention to the consideration which this proposition has received throughout the country.

Leonard Metcalf, consulting engineer of Boston, Mass., states in an article on "Private Fire Protection"

> "Another danger sometimes encountered is that resulting from the requirement of the insurance company of a duplicate source of supply in cases where this duplicate supply is of a polluted character. Under these circumstances if the check valves located upon the city service fail to operate properly and the polluted supply be pumped into the pipe system at a pressure greater than that maintained by the city in its pipe system, there will be danger of the passage of the polluted water into the city supply. This danger is a real one and if the pollution is gross, the two systems should be quite independent of one an-

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[13] American Water Works Association, 1907, page 466—Connections from Public Water Supply for Private Fire Protection.—A. W. Hardy.

[14] American Water Works Association, 1913, page 132.

> other. On the other hand, there are many cases where the conditions are such that the danger can be controlled with reasonable safety to the public by the use of duplicate check valves with suitable facilities for testing their tightness from time to time and proper regulations respecting precautions to be taken when testing the fire protection system and with suitable provision for periodic inspection. This is particularly true where the pressure at which the public supply is furnished exceeds at all times the private service."

Mr. Dow R. Gwinn, president water company, Terre Haute, Indiana, in speaking before the American Water Works Association[15] remarked that

> "Public health is a matter of vastly greater importance than that some property owner should save a little money by having connection with the public water mains. If money must be saved, save it in some other way than by jeopardizing the public health. The time is coming when automatic sprinkler connections with the public system will not be permitted."

He also speaks of the danger of reducing the pressure in the distributing system so that the general fire hazard is increased, adding another point to the danger of industrial connections to that of pollution.

Much has been said and is being said at the present time by the fire underwriters exploiting the use of the double check valve, stating that absolute protection is thereby afforded. Mr. William C. Lounsbury, superintendent of filtration, of Superior, Wisconsin,[16] does not believe that two check valves are better than one. On the contrary he feels that sometimes two check valves are twice as bad as one because when two check valves are installed there is a greater feeling of safety which is not warranted by the facts. The apparent safety is not assured because of having two inspections a year.

Not only is there danger due to the leaking of check valves, but one must not forget that in testing the pumps the pressure is frequently raised considerably above that of the city supply. Mr. E. E. Lochridge, engineer of water works, of Springfield, Massachusetts,[17] emphasizes this particular fact and states that there is a constant menace in the testing of pumps. Ordinarily the factory men state that they simply turn the fire pump over, but on inspection of the pressure gauge it is found that the pressure often exceeds that of the city mains. The mill people should be required to so arrange their fire system that there is no possibility of any impure water getting into the city mains for use by the people at the mill or by residents in the vicinity of the mill.

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[15] American Water Works Association, 1913, page 175.

[16] Journal American Water Works Association, 1913, page 178.

[17] Journal New England Water Works Association, 1908, page 481.

During the past few years much has been done to improve the character of these connections by the manufacture of better and safer valves. The old fashioned check valves are unsatisfactory and may permit the city water supply to be polluted frequently. It has been noted that the body of a check valve as ordinarily made of cast iron is hardly large enough to permit the valve to operate and the least formation of tubercles on the inside of the body is liable to arrest its opening or closing. It has been pointed out that a composition check valve would not be very expensive and would seem to be a point in the right direction in solving the trouble arising from check valves. Edwin C. Brooks, superintendent of water works, Cambridge, Massachusetts, has said:[18]

> Anyone who has ever had much experience with check valves, knows that they are an invention of the devil, and at best they are a poor contrivance."

Mr. J. Walter Ackerman, chief engineer and superintendent of water works at Auburn, N. Y., who presented a paper in 1914 before the American Water Works Association on the sanitary check valve, believes that they provide a greater factor of safety against pollution than the old installation, and that the installation of such valves is a decided improvement. It is his opinion, however, that where there is no such connection that the installation of the same could not be considered as an improvement of the supply and that it should rightly be considered as a possible source of contamination. This is particularly true owing to the fact that few people realize the danger which is attached to the use of such supplies. The care of the connection is, therefore, not to be overlooked.

METHOD OF PREVENTING POLLUTION BY INDUSTRIAL CONNECTIONS.

Information concerning the opinion of water works men about the country has now been added to that of specific cases where epidemics have occurred due to industrial connections. The question of how to protect the public water supply against pollution from industrial connections now confronts us. Few methods of solving this difficulty have been proposed and from the above facts it would seem that the only logical conclusion to reach would be that of eliminating any connection whatever, direct or indirect, with the polluted water supply. In order to provide fire protection for manufacturing establishments where no connection is permitted an independent or duplicate sprinkler system could be installed. The cost of such an installation would seem to be prohibitive. The fire underwriters also claim that such an installation is unsatisfactory owing to the fact that where the sprinkler heads are placed close together that the discharge of one may cool the one next to it to such an extent that it would fail to operate. This system, however, would certainly afford absolute protection to the people against contamination of the public water supply. Another system which could be installed is that of an elevated or storage tank into which both the city water and the private supply could be discharged. In this case it would be necesary to provide a free discharge of the city water in order to eliminate any opportunity of back flow to the city mains. The only additional cost in this case is the construction of a tank, excepting in a few instances where the city pressure would be insufficient to discharge the water into the tank. This cost would be small, however, even in cases where duplicate pumping would be necessary and in fact would be an adantage in affording more ample fire protection. Certain individuals interested in fire protection argue against the installation on account of the fact that the city pressure is not sufficient at all times to fill the tanks. When such conditions prevail it is certain that the demand at a time of fire would be such as to make the supply entirely unreliable and inadequate. It would seem that there is no logical reason why such an installation should not be provided in the majority of cases, even when it is necessary to install a water tank upon the roof of the building owing to the lack of ground space.

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[18] Journal New England Water Works Association, 1908, page 183.

The double check or sanitary check valve is especially designed in order to protect the city water supply against the polluted water of industrial connections. The moving parts of the valve are largely constructed of bronze with large clearances and the clapper is faced with a medium hard rubber closing on a seat of ample width to prevent injury to the rubber. The valve of the body is designed so that the clapper can be swung out through the bonnet opening, thereby providing easy access to the interior and affording convenient inspection. There can be no question that the valve is an improvement over the old fashioned check valve, but as noted above there is still some danger that the valve may not seat properly thereby permitting some of the polluted water to enter the city mains. It has been observed[19] that, when the pressure is not increased quickly upon the valve it does not seat proerly and some water will pass into the city distributing system. It would seem reasonable, therefore, to require that no physical connection be produced between the two supplies and that where two sources of supply are required provision be made for keeping them entirely separate.

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[19] J. Walter Ackerman, Journal American Water Works Association, 1914, page 92.

LEGAL OPINION REGARDING RESPONSIBILITY FOR POLLUTION OF WATER SUPPLY.

The above discussion would not be complete without giving briefly some of the legal opinions in regard to the liability of the municipality or water company when furnishing a polluted water supply to the people of any community. Dillon on Municipal Corporations, Fifth Edition, Section 1316, in discussing contamination of the water supply, states that

> "The obligation of a water company is not to provide water that is chemically pure, but water that is ordinarily and reasonably pure,[20] and in the performance of that obligation it is only held to the exercise of reasonable diligence.[21] If it is liable for impurity of the water, or for contamination which renders it unfit for domestic use, it must be on the ground of actionable fraud or negligence without contributory negligence on the part of the consumer.[22] If the water company knows, or from the situation ought to have known, that the water it is distributing in a municipality is dangerous for domestic use from causes not ordinarily discoverable by the exercise of reasonable care, it owes the duty to its customers of disclosing that danger, and a failure so to do, knowing that such customers are liable to use the water through ignorance of its character, has been said to be a fraud in law, rendering the company liable to legal damages to any person injured by such fraud without any fault on his part, and has also been said to be a failure of duty amounting to actionable negligence to which the same liability is incident."[23]

A cause of action for damages resulting from the impurity of the water sounds in tort in whatever way it may be regarded, and knowledge, or its equivalent, on the part of the consumer damaged, is essential to legal liability in the one case as well as the other.

> "After having secured a proper source of supply, the company is bound to exercise diligence in the effort to preserve the water from pollution, and deliver it to the public in no worse condition than that in which it is taken from the source of supply. If it neglects to perform this duty, or if by reason of the contamination of the source of supply from causes over which it has no control, the water is unfit for domestic or other uses, the company may, at the suit of a taxpayer, be restrained from collecting water rates, because it is inequitable that it should collect these rates when the consideration therefor has failed."

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[20] Brymer v. Butler Water Company, 172 Pa. 489.

[21] Green v. Ashland Water Company, 101 Wisc., 258.

[22] Green v. Ashland Water Company, 101 Wisc., 258.

[23] Green v. Ashland Water Company, 101 Wisc., 258.

In 1910 a damage suit was brought in the courts of Minnesota,[24] against the city of Mankato. Judge Jaggard in giving his decision has sounded the keynote to the problem of the protection of the public health as it would seem that it should be viewed not only by the courts, but also by the people at large. The complaint placed against the city of Mankato charged that the defendant city negligently allowed the supply of the water works system to become polluted with poisonous substances and large quantities of filth and sewage to escape into and saturate its water supply. By reason whereof plaintiff's intestate contracted typhoid fever and died as a consequence. The municipality used as one means of its defense the consideration that it was exercising a governmental function and, therefore, was not liable under the law. The court, however, held that the municipality was liable for its negligence in its private or corporate capacity and was not exempt because it was carrying out a governmental function. In the opinion of the judge the following is interesting. He states that,

> "It is obvious that a sound public policy holds a city to a high degree of faithfulness in providing an adequate supply of pure water. Nor does it appear why its citizens should be deprived of the stimulating effects of the fear of liability on the care and energy of its officials; nor why a city should be exempt from liability while a private corporation under the same circumstances should be held responsible for its conduct and made to contribute to the innocent persons it may have damaged."

The judge further states that,

> "Public policy requires the conservation of human life, the preservation of public health and the establishment of public sanitation on a firm and certain basis in the law."

CONCLUSION.

In conclusion, the dangers incident to the connection between private water supplies of polluted character and the safe public water supply cannot be overestimated. The means whereby fire protection may be afforded have been mentioned and the liability of either the company or city, which owns the public supply, in case the supply has become polluted through its negligence, has been shown by the opinions handed down by courts where such cases have been heard. It is interesting to note the dieffrent viewpoints held by the courts at the present time from those held 20 years ago. It appears that formerly the rights of property were paramount over the rights of individuals. Recently, however, the courts have changed the tenor of their decisions and are attaching more importance to the responsibility of the company or city in the protection of the public health.

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[24] Keever v. City of Mankato, 113 Minn., 55, 1910.

The fear of prosecution and the collection of damages should not be the impelling motive of local officials in the protection of their water supply against dangerous pollution. It should be their first aim to maintain the highest standard of purity possible in their water supply in order to protect the lives and health of the people. There is a distinct danger of having a water supply polluted through connections which may exist or which may hereafter exist between the public water supply and private supplies of polluted character. The only safe policy, therefore, is to insist upon a complete separation of the public water supply from any and all private supplies.

IMMUNITY AND SUSCEPTIBILITY.*

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GENERAL.

Definition. A clear understanding as to what is meant by the terms immunity and susceptibility is of fundamental importance. By *immunity* we mean the resistance which an animal or plant body possesses to the etiological microörganisms of an infectious disease and to the disease itself. The name has been adapted from the Latin *immunis* which meant a person who was free or exempt from public duties, and later, one who was exempt from the action of poisons. Briefly, *immunity is resistance to disease.* It results commonly as a natural termination of the process of self-healing in many infectious diseases. The absence of such resistance, which may be total or partial, characterizes what is known as *susceptibility.* Throughout the animal kingdom and also among the plants there is a great variation in the immunity and susceptibility in the different species to the various diseases. Immunity bears no relation to the contagiousness of a disease and the term is only applied as a rule to strictly infectious diseases and not to metabolic diseases.

Hypersusceptibility or Anaphylaxis. It has been shown that animals and men are occasionaly hypersusceptible to certain proteins. For example, there are individuals who are always seriously poisoned by the ingestion of eggs, pineapples, and strawberries. Certain individuals when injected with diphtheria or tetanus antitoxin which is carried in horse serum are seriously intoxicated and occasionally die. In such instances the proteins of the horse serum and not the antitoxin are responsible. It has been demonstrated that an animal may be sensitized or rendered hypersusceptible to almost any protein by first injecting a minute amount of the protein and then, after a period of at least eight to thirteen days, may be seriously intoxicated, if not killed, by the injection of a slightly increasing dose of the same protein. The proteins of the bacterial cells have been shown to act in the same way. Animals injected, as described above, may be rendered hypersusceptible to all bacterial proteins. Furthermore, as referred to above, individuals may be naturally hypersusceptible to bacterial and other proteins. The manner of the original sensitization in these cases is not known. Sensitization which has been either naturally or artificially acquired is transferred in most instances *in utero* to the first generation; that is, a mother may be sensitized, convey the sensitizing substances to her young while in the uterus, and when these offsprings are subsequently injected after birth with the same protein they may be intoxicated or killed. In this connection it should be stated that the so-called inherited tendency to specific diseases may be something more definite than we are ordinarily accustomed to regard it. Suppose a mother becomes tuberculous and is therefore sensitized to the proteins of *Bact. tuberculosis*; it is quite possible for her to convey to the offspring this susceptibility to the particular proteins of *Bact. tuberculosis* as has been demonstrated artificially. After birth, or in later life when the causal microörganisms of tuberculosis are taken into the body, as they are in about ninety-five percent of all persons in civilized countries, the bacteria may find a more than ordinary susceptible individual and may develop with comparatively little hindrance. If this condition be true naturally, as it is when produced experimentally in susceptible animals, a very interesting and scientific explanation of the so-called inherited tendency to tuberculosis is at hand.

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Predisposition and Non-inheritance of Infectious Diseases. There is probably no such thing as a truly inherited infectious disease. This point has been debated and discussed for a great many years and the above conclusion has been reached by the majority of investigators. By *inheritance* is meant the transferrence of a property, or in this instance, a pathogenic microörganism by the nuclear substance of either the spermatozoan or the ovum. It is only the nuclear substances which combine to form the new individual. It is true among certain of the lower animals such as the fowls and some insects, that microörganisms are carried within the egg but the eggs are quite different in structure from the human or mammalian ovum. The egg of the above mentioned animals is composed largely of yolk-furnishing food and there is ample opportunity for microbic growth while the mammalian ovum contains no yolk. Such instances should be referred to as *germ cell transmission,* not inheritance. If the microörganisms were present they would be immediately incorporated within the new developing embryo. If the microörganism ever did find its way into the human or mammalian germ cells it would be a mechanical impossibility for the cells of the embryo to divide and multiply in proper manner. Such pathogens would rapidly destroy the developing cells in the embryo. It is true that the offspring of certain individuals are born diseased. For example, children are frequently born with syphilis and tuberculosis. At first thought it might seem that this is inheritance but on careful analysis it will be found that the mother is either syphilitic or tuberculous. Furthermore, the locus of the infection is most frequently in the uterus and the microörganisms are transferred to the unborn offspring by means of the fetal circulation. This condition is what is known as *ante-natal acquirement;* it is not heredity. It is absolutely impossible for the male to communicate any disease to the offspring unless the female is first infected. Colle years ago formulated a law which bears his name in which he stated that a father could communicate syphilis to his child without the mother being infected. This law has been disproven since the introduction of the new serum tests for syphilis and it can be positively demonstrated in all such cases that the mother is infected. Ante- or pre-natal acquirement may then be recognized. What can be said in regard to the predisposition to a definite infectious disease? There is a question as to whether true predisposition does exist. Many cases are on record to show that disease seems to run in families and in localities. For example, tuberculosis and cancer are frequently said to be subject to inheritance or to predisposition in certain cases. It can be easily seen that if one parent is diseased the germ cell of the parent will be less healthy and when combined with a normal healthy germ cell of the other parent will not give rise to as healthy an individual as when both cells are from healthy individuals. Again, the result when the germ cells of both parents are unhealthy, due to the parents being unhealthy, is evident. Predisposition seems to resolve itself into the inheritance of a weakened constitution, a constitution which will not withstand the ordinary infections easily. It seems not to be a predisposition to any particular disease but a predisposition to all diseases, infectious and metabolic. Diseases such as tuberculosis are so prevalent that it is very possible that infection may take place and be interpreted as inherited because the parent died of the same cause. As mentioned above, it may be that the true explanation of the phenomena of predisposition is found in anaphylaxis or the sensitization to various proteins of microörganisms. Further work is necessary along these lines.

IMMUNITY.

Immunity and susceptibility to disease are always relative and never absolute; that it, it is always possible to produce some sort of an infection in a supposedly immune animal by modifying the conditions under which the animal is accustomed to live. For example, the chicken is immune to tetanus but by keeping this animal for some time at a temperature higher than its normal it may be infected. The cow cannot ordinarily be infected with typhoid but when large numbers of the *B. typhosus* are injected under the skin an abscess may be produced. These and many other examples might be mentioned. Our standard of immunity in a particular animal is based upon the conditions as they exist naturally and on the average resistance of animals of the same species.

Immunity to disease may be of two kinds, natural and acquired. *Natural immunity* is that resistance which is possessed normally by an individual. *Acquired immunity* is that resistance which is acquired by having an infection, or by being vaccinated, or immunized against an infection with the specific etiological microörganism or its antiserum.

Natural Immunity and Susceptibility. Attention should be directed to certain forms of natural immunity and susceptibility.

Racial Immunity and Susceptibility. It is a familiar fact that certain species of animals and certain races of men differ in their resistance and their susceptibility to infectious diseases. As example of racial immunity among animals the native cattle of Austria-Hungary and of Japan which are relatively immune to bovine tuberculosis, a disease which causes great loss among other races, may be mentioned. Again, the sheep of Algeria are relatively immune to anthrax while all other sheep are extremely susceptible. Field mice are immune to glanders while the common house mouse is susceptible. The negro is more resistant to the infectious microbic agent of yellow fever than other races, but is without doubt more susceptible to tuberculosis. The Japanese are said to be more resistant to scarlet fever than other races. The Melanesians are very susceptible to measles and the Malaysians to beri-beri, while other races are relatively immune.

Familial Immunity and Susceptibility. It is true that certain families vary in their immunity and susceptibility when compared with other families in the same community. For example, tuberculosis undoubtedly shows a tendency to run in families. In determining a case of this kind it is, of course, necessary to take cognizance of the environment of the individual and the association with other diseased persons. The so-called tuberculous diathesis does exist and perhaps we have an explanation of it in anaphylactic phenomena as mentioned previously. Measles and scarlet fever also in certain instances seem to run in families.

Individual Immunity and Susceptibility. Variation among individuals associated together is noted in regard to their resistance and susceptibility to disease. It is well known, for example, that in a herd of cattle, which are in the main tuberculous, there are certain individuals who never contract the disease. These animals may be of the same breed and be fed and handled the same as the rest of the herd still they never become infected. Again, in the human race, with the acute exanthematous diseases such as scarlet fever and measles, there are children, for example, in the same family and of nearly the same age and living under exactly the same conditions, who contract the disease and others who do not. The exact cause of the individual, familial and racial immunity cannot be satisfactorily explained at the present time. There is also a variation in the individual's resistance at different times dependent upon food, sleep, work and general hygienic conditions.

Factors of Natural Immunity. The natural immunity of any individual to an infection may be dependent upon several things as follows:

The Protection Afforded the Body by the Surfaces. The body surfaces may be conveniently divided into those which are external and those which are internal.

Skin and Cutaneous Orifices. The first protective mechanism that we wish to call attention to is the skin. It is a well known fact that virulent bacteria are frequently present on the skin of seemingly normal and healthy individuals. Perhaps the most common of these is the *Strept. pyogenes* and the *M. pyogenes vars. aureus* and *albus.* These microörganisms and others live largely as saprophytes, feeding upon the dead and desquamating epithelial cells. The skin is impermeable to these microörganisms when it is unbroken in its normal state. Experiments have been performed to determine whether the skin is normally permeable to bacteria. Bacteria have been rubbed into the skin and have produced infection but in these instances the skin has been abraded by the mechanical irritation. Bacteria may infect the sudoriferous and sebaceous glands and their ducts, in case the metabolic activity of these structures is disturbed. The ducts and the glands of the skin are protected ordinarily by a flow of the secretions. In case the flow of the secretions is decreased and the orifices of the ducts contracted as in cold weather, while bacteria find it more difficult to pass down than before, they occasionally do produce an infection. When a hair follicle is diseased and the shaft contracted or perhaps dropped out, bacteria may pass down and produce an infection. *B. tetani* of tetanus or lockjaw, frequently passes through the skin by means of deep penetrating wounds. The same is true of some other pathogens.

In case bacteria are successful in permeating the skin either directly or by means of cutaneous orifices, they are usually able to set up a marked inflammation of these structures and produce necrosis of the epithelium. It is in this way that pustules, boils, carbuncles, and various forms of cellulitis are produced. The secretions of the sebaceous glands are not germicidal but are perhaps slightly antiseptic due to the salts which are contained therein. Furthermore, as soon as the serum from the blood is extravasated there may be slight germicidal action on the bacteria infecting the skin. The soluble toxins of bacteria cannot be absorbed through the unbroken skin.

The Subcutaneous Tissue. In case the bacteria are successful in permeating the skin and penetrating the subcutaneous connective tissue, again, various protective mechanisms show themselves. This resistance is due to a very rapid production of new connective tissue which serves to mechanically limit the infection. It is due, furthermore, to the germicidal action of the serum, the mechanical and germicidal action of the fibrin and the phagocytic activity of the leucocytes. These various factors will be discussed subsequently in connection with the phenomena and the protective mechanisms of inflammation.

The Exposed Mucous Membranes of the Body. The exposed mucous membranes of the body usually are covered with a variety of bacteria, some of which are pathogenic. Their moist condition favors the growth of microörganisms, but the mucous which is secreted upon them forms a mechanical bearer to the bacteria and serves to wash them away. This mucous is not germicidal but is perhaps slightly antiseptic. The only mucous membranes of the body that are really exposed are those of the eyelids, lips, anterior nares, genito-urinary apparatus and the anus. It is perhaps more convenient to discuss these membranes in detail in connection with the cavities which are connected with them.

Nasal Cavity. Microörganisms find a barrier to the entrance of the nasal cavity in the hairs which protect the anterior nares and serve to keep out the dust from the inhaled air. The membranes of the nasal tract, besides being covered with mucous, which acts as above mentioned, are also covered with ciliated epithelial cells which move from within out and serves to wash the mucous con which move from within out and serve to wash the mucous conmembranes are, however, not uncommon. *Bact. influenzae, Strept. pyogenes, M. pyogenes vars. aureus et albus, Bact. diphtheriae, M. intracellularis var. meningitidis,* and occasionally *Bact. mallei* produce infection through this membrane.

The Mouth. The mouth probably contains the largest variety of bacteria to be found anywhere in the body. A large number of these bacteria are non-pathogenic, although pathogenic microörganisms do occasionally occur. All the requisite conditions for bacterial growth are provided in the mouth, namely, temperature, moisture and food. The food supply is largely derived from materials which have been deposited during the process of mastication between the teeth and in the various depressions of the mucous membrane. The microörganisms also feed upon the desquamated squamous epithelial cells. They are being constantly washed off the membrane by the saliva which contains a certain portion of mucous. The saliva is not germicidal, and in all probability only very slightly antiseptic. The most permeable part of the mouth is in all probability the tonsils which separates this cavity from the pharynx or throat. These lymphatic structures have many deep crypts, and bacteria once entering the tissues of the tonsils may gain access to the lymphatic circulation through these structures.

In case bacteria are successful in passing the obstacles of protection afforded in the nose and in the mouth and pass into the throat, there are two routes for their entrance into the internal body, namely, through the trachea and bronchi into the lungs and through the oesophagus into the stomach and intestines.

The Lungs. In case infectious microörganisms pass down the trachea and bronchi they meet first with the obstruction of the mucous which is secreted upon the surfaces of these tubes. In addition, ciliated epithelial cells are present and serve to cleanse the surfaces from microörganisms as in the nose. Occasionally microörganisms lodge along the trachea and the bronchi and produce slight irritations which if left undisturbed may immediately produce serious infections. However, the leucocytes from the neighboring bronchial and mediastinal lymph glands pass through the walls of the trachea and bronchi, ingest the mircoöganisms, carry them back to the glands and in a majority of instances destroy them. Occasionally however, leucocytes containing virulent microörganisms get into the lymphatic circulation and these are carried by the diffusion currents in the lymph vessels down to the alveoli of the lungs and here may cause inflammations of a more or less serious character. It is probable that the *Strept. pneumoniae* is very frequently carried to the alveoli of the lungs in this way. Without doubt, microörganisms cannot be directly inhaled through the air passages into the alveoli of the lungs during an ordinary inspiration, but it has been shown that in forced inspirations, such as those attending upon coughing, hiccoughing, sneezing and sighing that they may be so carried.

The Stomach. In case the microörganisms pass down the oesophagus into the stomach, they immediately come into contact in the normal organ, with the gastric juice, which contains the hydrochloric acid in such concentration that it is at least antiseptic if not germicidal. In case the functional activity of the stomach is disturbed and the hydrochloric acid is diminished in amount, microörganisms may grow in the stomach to a limited extent. Furthermore, in case all the particles of food are not thoroughly broken up in the stomach, bacteria which may be contained within these particles may pass through the stomach into the intestine.

The Intestines. In the intestines the microörganisms come in contact with the alkaline pancreatic juice which is slightly antiseptic, and with the bile which is antiseptic and in certain instances bactericidal. They find no particularly favorable conditions for growth in the upper part of the small intestines under normal conditions. Here also mucous covers the surfaces. However, if the functional activity of the small intestines is disturbed, bacteria may enter the lymphatic structures (Peyer's patches, solitary follicles) low down in the small intestines and produce infection. Such is the case with *B. typhosus* of typhoid fever and with the *Msp. comma* of Asiatic cholera. Bacteria which have been prevented from development in the small intestines frequently find the opportunity in the large intestine. Here the concentration of the various digestive juices is lowered and the requisite conditions for maximum bacterial growth are provided. Nevertheless, infections of the large intestine with bacteria are not common but may occur, colitis of various forms resulting. The various dysentery amoeba very frequently develop in the large intestine.

The Genito-urinary Tract. The mucous membranes of the genito-urinary tract, varying in male and female, present the same features as those of other mucous membranes. Besides the secretion of mucous, various other acid-containing secretions are often present. In addition, in the urinary tract the mechanical factor of irrigation removes the microörganisms. Not infrequently, however, microörganisms do enter these mucous membranes and produce serious infections, such as the *Treponema pallidum* of syphilis, the *M. gonorrhoeae,* and the *B. chancroidae mollis.* Sometimes these membranes are infected with ordinary pyogenic bacteria.

The Conjunctiva. The conjunctiva is protected against infection in several ways. First, the eyebrows with their hairs and the eyelashes prevent microörganisms and particles of dust and dirt carrying microörganisms from entering the eye. Again, the lachrymal secretion or the tears flowing across the eye from the outside in serve to wash this membrane. Bacteria are frequently washed off the conjunctiva and pass down through the lachrymal duct into the nose where they meet the obstructions which have been previously discussed. In all probability the tears are only slightly antiseptic and not germicidal at all. The conjunctiva is sometimes infected with microörganisms and furthermore serves as a point of entrance into the body when it itself is not infected. There is no doubt but that the *Bact. influenzae*, the *Strept. pneumoniae*, and other microörganisms may enter the body and get into the lymphatic and blood circulation in this way.

It is evident, therefore, that the protection afforded an individual by the body surfaces is a decided factor in the natural immunity of that individual.

The Protective Nature of Inflammatory Processes. It has been mentioned in a previous discussion that when bacteria successfully enter a tissue and develop in that tissue that a complex local change results which we designate as *inflammation*. In the majority of instances inflammation is of a beneficial nature. Fundamentally, it is always beneficial. Few examples of the pernicious results from inflammation can be given. In this connection may be mentioned the thickening of the cerebral blood vessel in syphilis and the increase of connective tissue in cirrhosis of the liver. In these instances the inflammatory processes are brought about by the reaction of the various tissues to the irritation of the infecting microörganisms. Unluckily these reactions are not on the whole beneficial to the body, but, as before stated, inflammation is usually beneficial and may be characterized as *the reaction of tissues to injury*. The exact processes of inflammation may be traced in case an infecting microörganism succeeds in entering the tissues of the body. The organism having produced its toxic substance first causes a congestion of the blood vessels in the region (hyperemia). Following this localized congestion there is an extravasation of plasma from the blood vessels. This plasma immediately on leaving the vessels coagulates or clots, producing throughout the infected area fibrin and blood serum. This fibrin serves in a mechanical way to limit the infection, and it has been recently demonstrated that the fibrin possesses germicidal properties in addition. Furthermore, the serum in a large number of instances exerts a bactericidal effect upon the microörganisms. Following the extravasation of blood plasma from the capillaries, the leucocytes pass out and gather around the infected area. These leucocytes are attracted to the area due to the presence of various chemical substances (chemotrophism). They will come as close to the microörganisms as possible, depending upon the effect of the toxins which have been produced. In certain instances they will ingest the bacteria and destroy them. In such cases, the bacteria having been removed, the inflammation rapidly subsides and the infection is, therefore, checked. Such are the characteristics of an acute inflammation. Inflammations, however, not infrequently depending especially upon the microörganism producing the infection, may become chronic, and in such a case the inflammation after passing through the acute stage as indicated above, stimulates a proliferation of the connective tissue in the part infected. In such cases, around the outside of the ring of leucocytes, which have been unable to ingest the bacteria, young embryonic connective tissue cells which are known as *round cells* are found. In case the inflammation progresses, the leucocytes are destroyed and the round cells next to the infected area assume more of an elliptical shape and are known as *epithelioid cells*. On the outside of this layer of epithelioid cells will be found newly produced round cells, and on the outside of the round cells an area of recently migrated leucocytes, those passing out in the beginning having been destroyed by the toxic action of the infecting microörganisms. Frequently the newly produced connective tissue passes on to the adult type and in this instance completely walls off the area of infection and the infecting microörganisms. In such cases the inflammation and the infection are checked. Among the diseases caused by microörganisms which have a tendency to produce chronic inflammation may be mentioned those of tuberculosis, leprosy, syphilis, actinomycosis and glanders. It is not an uncommon observation in man to note in the lungs and in other parts of the body healed areas of tubercular infection; areas that have been completely walled off by the development of adult fibrous tissue. It is probable that about ninety-five percent of all individuals living in civilized communities are infected with *Bact. tuberculosis* some time during their lives. The inflammation produced by this microörganism passes through the acute stage and into the chronic before being successfully combated and thoroughly walled off. Such an area is known as a tubercle, and in the other diseases mentioned, similar areas of like structure are produced. It depends entirely upon the virulence of the infecting microörganisms and the resistance of the connective tissue of the individual infected as to whether healing will result.

Natural Antitoxins. It is an observed fact that certain animals resist the action of toxins produced by bacterial and other plant and animal cells. The question arises as to whether these animals are immune to the toxins on account of the presence in their bodies of natural antitoxins or other substances. If antitoxin is present it can be detected by experiments made by drawing off the blood serum of the animal and combining it in varying proportions with the toxin in question. These experiments may be made *in vitro*. When toxins and antitoxins are combined in proper proportion and incubated together a non-toxic molecule is produced which when injected into a susceptible animal will produce no effect. It is, of course, necessary in this connection to inject the animal with a minimum lethal dose of the toxin in question as a control. If no natural antitoxins are present in the serum of the animal in question, the animal experimentally injected with the combined toxin and serum will die as a result of the noncombination of the toxin. In this way natural antitoxins may be tested. Natural antitoxins for diphtheria have been detected in the blood serum of about fifty per cent of normal individuals and about thirty per cent of horses. However, their occurrence in other animals for this specific bacterium and for other species is comparatively rare, and the explanation of the fact that certain animals are immune to toxins must be found elsewhere. It has been shown for example that the frog is immune to tetanus toxin, and that, when this animal is injected with this toxin that a large part of the toxin remains unchanged in the circulation for a variable period of time and may be later drawn off in the blood serum and will produce a toxic effect when injected into a susceptible animal. There are no natural antitoxins present in the blood serum of the frog and it has been found that the immunity of this animal is due to the fact that there are no cells in the body possessing the necessary side-chains (open valencies) for chemical combination with the toxin and the subsequent intoxication of the cells does not result. It seems that the best explanation of the fact that certain animals are immune to toxins is found in the fact that there are no chemical substances in the cells with which toxin can combine. It is probably not true that natural antitoxins explain all the phenomena in this connection.

Natural Antibacterial Substances. Natural antibacterial substances are present in the blood serum and body fluids of a large number of animals. In order to demonstrate the presence of the natural antibacterial substances it is necessary to inject the experimental animal with a carefully washed culture of the bacteria in question. If the animal remains uninfected, two prossibilities present themselves: First, the presence of natural antitoxins; and second, the presence of antibacterial substances. It is necessary, of course, to have excluded the possibility of natural antitoxins, it having been demonstrated that the organism injected produces its diseased effects by endotoxins held within the bacterial cell rather than by toxins. There is no evidence indicating the presence of natural antiendotoxins in any animal. The antibacterial action of the blood may be due to two constituents, namely, cellular substances (leucocytes) and chemical substances in the serum. The rat and the dog are both immune to anthrax but the immunity of the dog is not due to antibacterial substances but to the phagocytic activity of the leucocytes, while in the rat the immunity is not due to the leucocytes but to the antibacterial substances. In order to demonstrate the fact that the leucocytes are not responsible for the immunity in the given animal it is necessary to combine the bacteria in question with the leucocytes *in vitro* and after incubation make a careful examination with these cells to see if they have taken up any bacteria.

Antibacterial action is due to two substances in the serum. First, the thermostable substance which combines with the bacteria called an *amboceptor,* and second, a thermolabile substance called a *complement* which combines with the amboceptor after this substance has combined with the bacterial cell. It is sufficient to say at this time that these substances occur in normal sera and that the result of their combination with the bacterial cell causes the death of the bacteria and in some cases a lysis (solution) of the bacteria in addition.

There may be present in the serum of animals antibacterial substances of three kinds. First, those with just killing bacteria (bactericidal), second, those killing the bacteria and dissolving them (bacteriolytic), and third, we may have leucocytes which are active in the ingestion of the specific microörganisms. In all probability the over activity of leucocytes in every case of natural phagocytic immunity is due to the presence of normal opsonins,— substances which sensitize the bacteria and render them susceptible to phagocytosis.

Normal Hemolysins. Normal hemolysins (hemoglobin-liberating substances) are present in the sera of certain animals for the red blood corpuscles of other animals of different species, and for the same species, but never for the red corpuscles of the animal from which the serum was obtained. Such substances are known respectively as *heterolysins* and *isolysins* and if the latter occurred the name *autolysin* would be applied.

Normal Agglutinins. Normal agglutinins for various bacteria, such as *B. typhosus, Msp. comma, Bact. dysenteriae, B. coli,* and *Ps. pyocyanea* are present in the blood serum of some animals. It is necessary, of course, to exclude normal agglutinins when testing the serum of the infected case for the purposes of diagnosis as will be mentioned later.

Normal Precipitins. No normal precipitins for bacteria occur in the sera of animals. Precipitins for various blood sera, however, do occur. For example, human serum will precipitate the monkey serum, etc. These substances will be discussed in detail under acquired immunity.

(*To be continued.*)

A SURVEY OF INDUSTRIAL HEALTH-HAZARDS AND OCCUPATIONAL DISEASES IN OHIO.

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(*Continued.*)

PART III.

INDUSTRIAL HAZARDS.

We will next take up the individual health-hazard and discuss the elemental principles concerned.

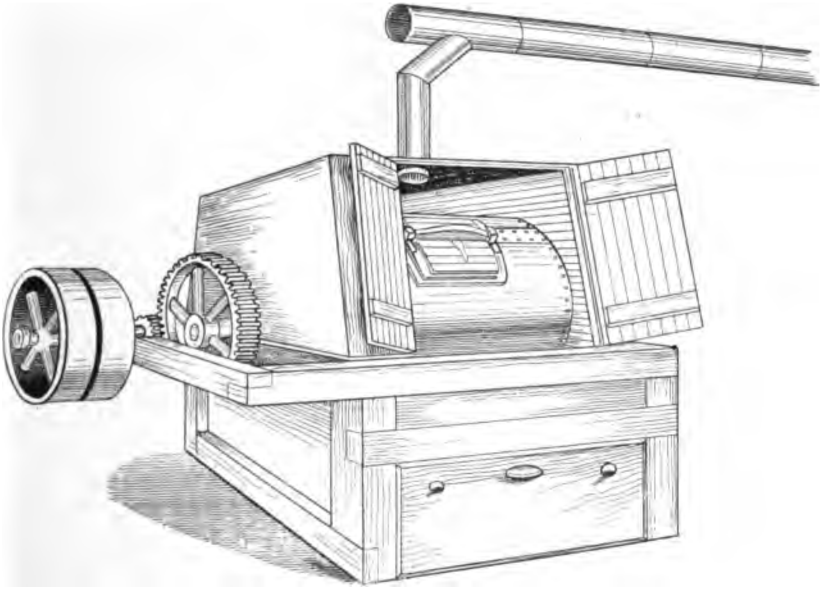

Fig. 1. Dry Grinding and Mixing of Ingredients.

Inclosed ball-mill in use in a porcelain enamel works, equipped with exhaust, dust-tight doors and collecting drawer. Adaptable in many plants.

DUST. — Dust may be inhaled, or ingested, or affect the skin, the eyes and the ear canals. The daily subjection to dust, for more than brief intervals at a time, is always damaging. The skin and the eyes may become physiologically inured to it, but not so with the internal organs. The least harmful dusts are those arising from the natural earth itself, such as the farmer is subjected to, although there are many exceptions to this in the case of alkali, sandy, or stony earths, etc. White flour and starch appear to be practically harmless to the normal person, soapstone dust and talc may be placed next in order, but a tuberculously-inclined person subject to these, if they do no more than irritate the nose and throat and promote coughing, is almost certain to see an increment in his disease. Next in order of harmfulness come wood dust, bran dust, coal dust, clay dust, ore dust, mineral dust and stone dust. It will be seen that the organic dusts are the least harmful. Dusts in general produce a chronic catarrh of the respiratory and digestive organs. This leads to a fibrosis, which is the same process that is gradually brought about by old age. These catarrhs and fibroses result in lowered resistance of the damaged parts, and invite secondary diseases, which are usually the cause of death.

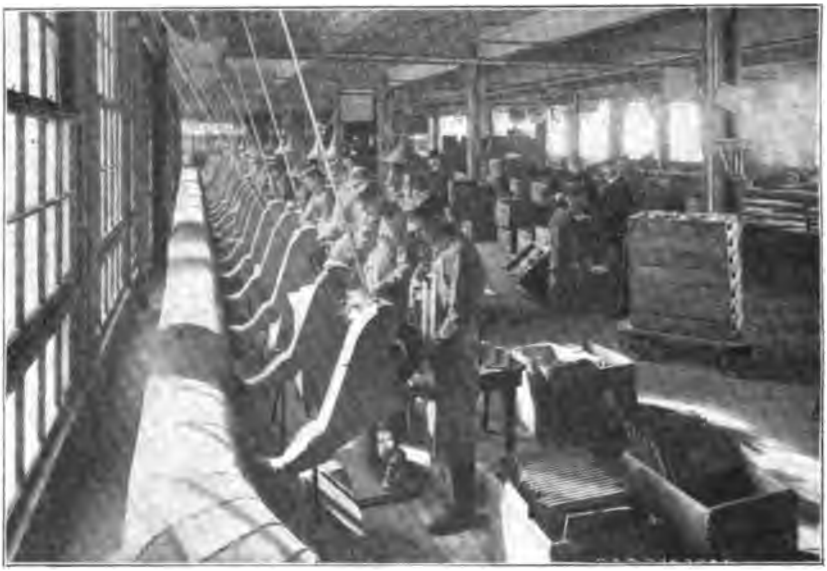

FIG. 2. METAL POLISHING.

Ideal exhaust system for dust in a polishing department. Plenty of light.

All diseases of the lungs, due to dust, are called *pneumonoconiosis* (lung-dust-disease); iron dust, produces a condition called *siderosis;* sand, flint and stone, *chalcicosis* and *silicosis;* coal dust, *anthracosis:* cotton-fibre dust, *byssinosis;* clay dust, *aluminosis;* tobacco

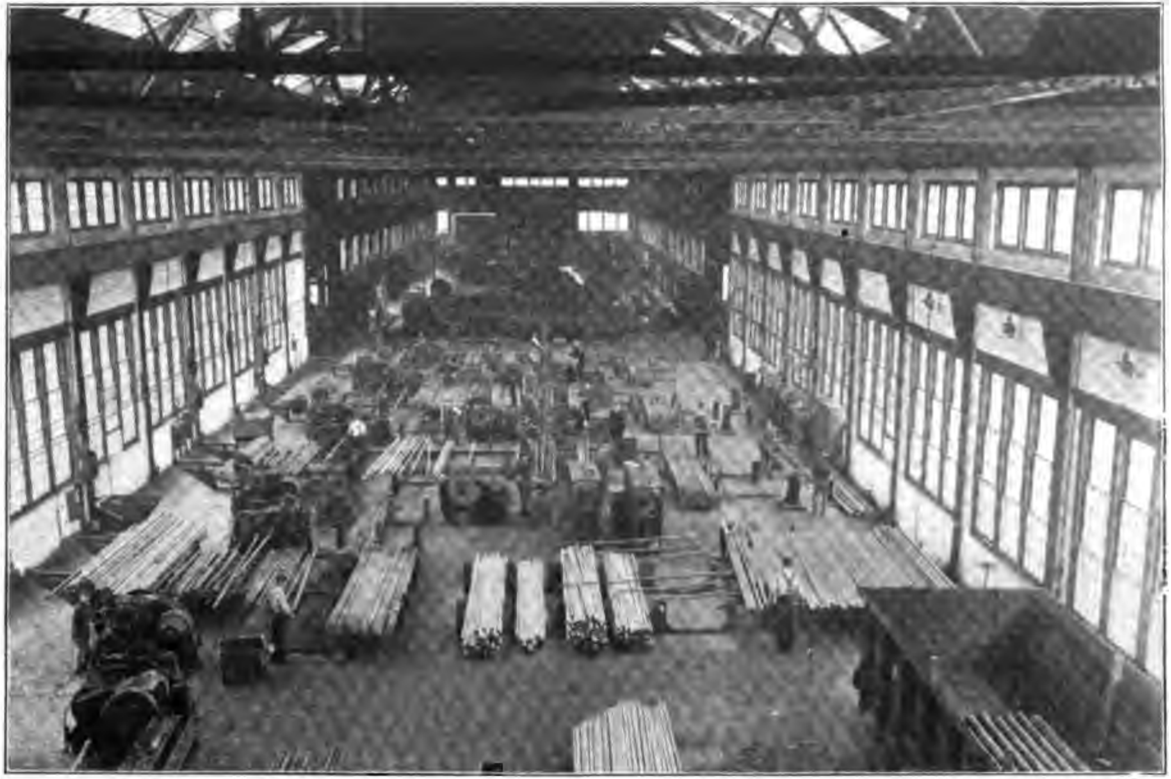

FIG. 3. IRON AND STEEL WORKS INTERIOR.

Showing great care given to order, cleanliness and light. Quarters are also very spacious. The shape of this mill room renders it much easier to ventilate than if it were square.

dust, *tabacosis;* etc. Fibrous tissue is formed around these particles in the lungs, destroying the function of respiration in such parts, and resulting, in the end, in a condition called *phthisis,* which is usually complicated by the presence of the *bacillus tuberculosis,* which is enabled to propagate because of the shutting off of the blood supply by the fibrous tissue. Two-thirds of a pint of coal dust has been found in the lungs of a former coal miner. One-third of the weight of the lungs of a rock-driller has been found to consist of rock dust. Probably the most harmful dust of all, with the exception of poisonous dust, is emery dust, which is composed of exceedingly hard, crystalline, sharp particles; next to this comes sand or sandstone dust, to which workers are subjected in surfacing, polishing and crushing stone, in sandblasting, etc.

No person should work in a dusty atmosphere. Either by mechanical means, wet processes, and modification of processes, or by personal hygiene, as respirators, etc., dust can be kept out of the human system. Dry sweeping during work hours is a most vicious practice. Vacuum cleaning not only for floors, but in many dusty processes, is especially recommended. In dust mixing processes much of the material can be handled by vacuum pipes instead of scoop shovels.

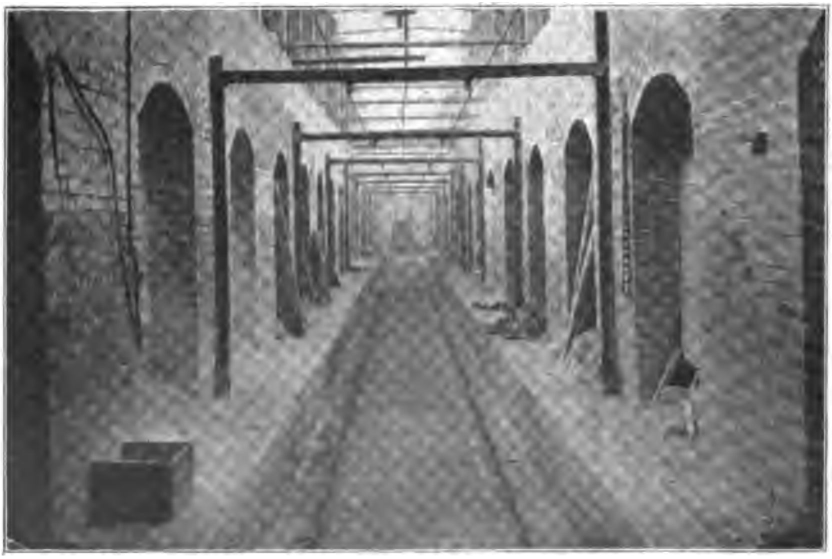

FIG. 4. CLAY STOCK HOUSE.

An electric motor car, upon which is fitted a weighing apparatus, gathers the clays from the various bins.

Civilized man enjoys no immunity over the original or native man in this respect, for whom dust was not intended.

DIRT. — Dirt is put in as a health-hazard, not because to the cultured it is undesirable, but because dirt and disease co-exist. Dirt accumulating from trade processes becomes dust. A dirty place is the first place in which one is inclined to spit, hence dirt accumulations are very liable to harbor disease germs. Dirt often contains poisons accumulating from manufacturing processes, which dry out and become dust. Vacuum cleaning is again called attention to.

We wish to give "Dirt", however, a broader scope. Disorderly accumulations of materials, by-products and waste products should be removed from workplaces because they have a sub-conscious deteriorating effect upon morals, upon the inclination and the ability to work, and upon the observance of health standards beyond the workplace, to say nothing of the hindrance to production itself. The insistence upon a clean and orderly place in which to work is fundamental from three points of view — physiologic, psychologic and productive capacity, or output.

DARKNESS. — Continual subjection to this health-hazard is universally acknowledged by practically all persons, as well as hygienists, as incompatible with health. The best light in which to work is, of course, daylight — the only modification of this being protection from the direct rays of the sun, particularly for sedentary or confined workers. After this a good quality of artificial light does not appear to be detrimental to health. Illuminating engineers claim,

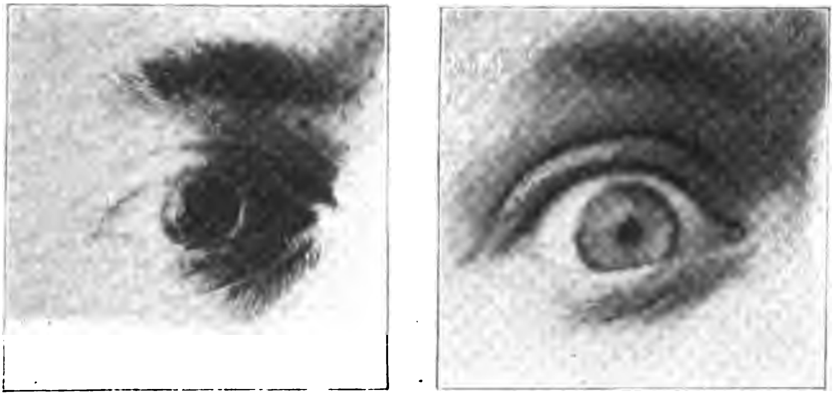

FIG. 5.

Pupil of eye dilated to let in plenty of light when illumination is dim.

Same pupil contracted to shut out excessive light.

BOTH CONDITIONS MEAN EYESTRAIN AND ARE VERY FATIGUING.

and certainly, from a physiologic point of view, with very good reason, that more than half of workplaces are improperly lighted; also too expensively lighted, considering candle-power. In other words, there is a vast amount of importance to be given to lampshades, reflectors, globes, etc., as well as to positions. A flickering light, or a dim light can be just as fatiguing, from its effects upon the human eyes, as the most laborious work. On the other hand, brilliancy is equally as dangerous. We see the extremes of this in some of the furnace and melting processes, where eyes are subjected to intense heat, as well as light, thus predisposing to ageing (cataracts, retinitis, conjunctivitis, etc.) Extremes are seen in the case of welding by the various types of blowpipes and electric methods now in vogue, in which not only the eyes require to be protected by alternate layers of colored glass, but even the skin, to prevent the consequence of can-

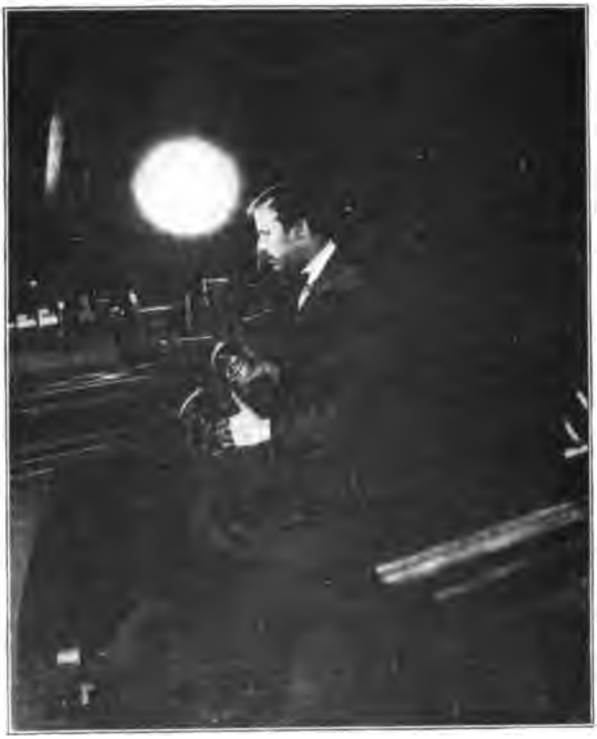

FIG. 6. POOR ILLUMINATION.

More light in the eyes than on the work. Sharp shadows and much glare from the polished metal. Discomfort to the worker; loss to his employer. Danger of accidents. Many factories are too expensively, but very poorly lighted.

cer. The eye also suffers from contrasts of light and shadows, as are seen particularly in rooms where furnace glares are mostly depended upon for lighting. Such conditions, of course, produce inaccuracies of execution, and lead to accidents, as well as curtailment of production. Nystagmus, or dancing pupils, so commonly seen among coal miners, has been recently shown to be due essentially to poor lighting. The eyes are greatly fatigued by looking down constantly upon bright objects or reflecting surfaces. For instance, many persons suffer from headache when they look upon an expanse of river or lake water while the sun is shining. The retina of the human eye is normally adapted to high-lights (the sky) which come above the center of the field of vision, and to dark tones and colors in the lower field of vision. Looking down upon white reflecting surfaces, as upon paper, in ironing white goods, etc., is the cause of considerable industrial headache, much of which can be prevented by the wearing of eye shades or the use of dark glasses.

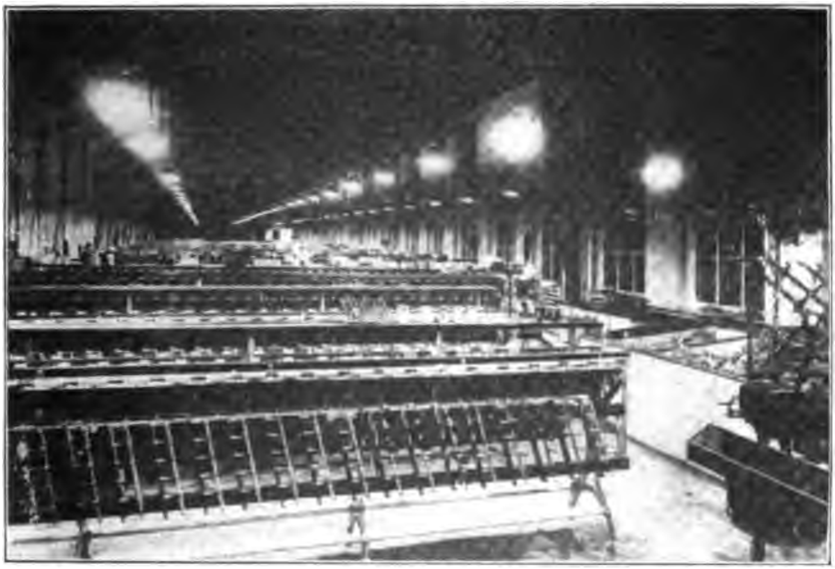

FIG. 7. WELL LIGHTED FACTORY ROOM.

A factor in safety, health and production.

DAMPNESS. — Again, it is obvious to most persons that working continually in a damp place, particularly if within doors, is inimical to health. By dampness we mean not only moist, but wet places, steamy atmospheres, or air in which the humidity is maintained at a higher point than 65°. If, to such conditions, changes in temperature, either up or down from 68° take place, the risk to health becomes greater. Those whose work necessitates exposure to water and dampness should not be required to do sedentary work unless temperature is carefully controlled, and recreation periods are arranged for. They should be provided with rubber boots, rubber aprons, etc., in addition to all mechanical means devisable to remove water and steam. Where other health-hazards are associated with this feature of dampness and moisture, workers should have bathing facilities, such as the shower bath, and obviously, such necessities as lockers for street clothing. Some establishments wisely provide drying rooms in which to hang damp working clothes.

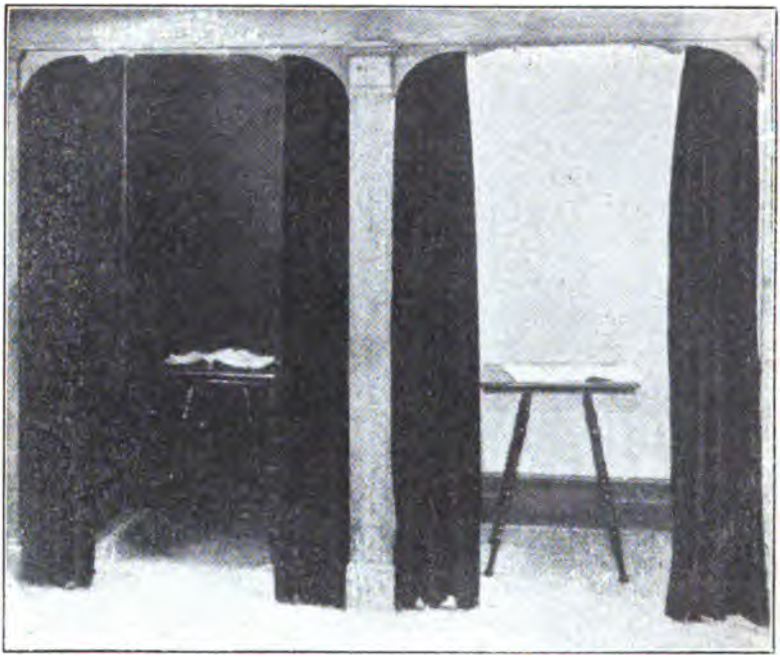

FIG. 8. DARK WALL SHADES AFFECT ILLUMINATION.
Each of these two little rooms receives the same light. Dark walls absorbed most of the light in left-hand room.

By far the vast majority of workshops and factories, however, are afflicted with the opposite condition, DRYNESS. An experiment made in almost any factory or workshop room, office or store, during the months of artificial heating will show that the relative humidity, instead of ranging betwen 60° and 70° for a temperature of 68°, is very much below this. This applies to nearly all steam-heated, hot-water heated, or hot-air heated quarters. This dryness of the atmosphere also promotes disease, first evinced as an irritation of the nose and throat, the glands of which are forced to produce extra moisture in order to enable these parts to perform their functions. In time acute colds and contagions are easily acquired. Then there are chronic coughs, and, from this on, a large variety of disease conditions are possible. Humidifiers, air exchangers, and especially fans to keep the air in motion are urgently needed almost everywhere in indoor workrooms.

The readings of the wet-and-dry-bulb thermometer should regulate these conditions. This is a most valuable instrument, and should be placed in almost every place of human habitation, especially mill-rooms, work-rooms, offices, stores, school-rooms, etc., in the state. It records "sensible temperature", as well as actual temperature, and its humidity readings will surprise, many times, as well as explain why rooms seem stuffy and hot or cold and damp when the ordinary thermometer is recording normal! There are several forms of the instrument. The sling psychrometer is best, but any of the stationary wall forms will suffice if the air is put in motion, as by fanning in front of them before taking a reading. The adoption of cloth windows in the lower frames of the ordinary window appears to be capable of solving this question to a large extent. It has been shown that a medium grade muslin cloth of light color retains heat much better than glass and permits an exchange of air and

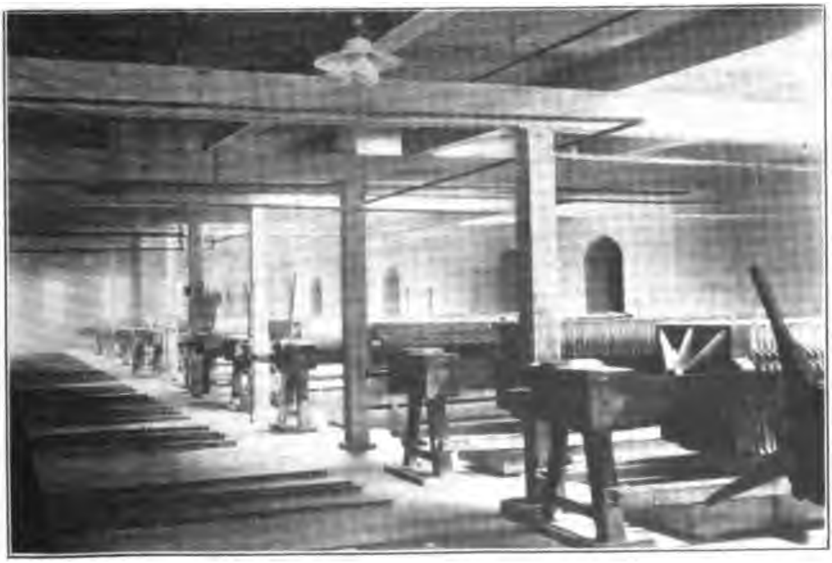

FIG. 9. CLAY PREPARATION IN POTTERY WORKS.
Showing filter press room of model construction in an art tile plant.

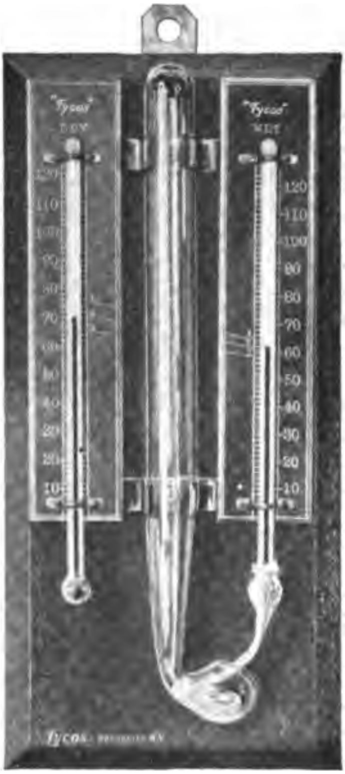

FIG. 10. THE WET-AND-DRY-BULB THERMOMETER.
This instrument gives relative humidity and "sensible" temperature. The most important health indicator made. A fan should be turned upon it to put the air in motion while taking a reading.

moisture almost unhampered, while light is, if anything, better diffused.

DEVITALIZING AIR.—Bad air conditions in work places may be due to (1) deoxidation (presence of flames, furnaces), (2) contamination (escaping gases, vapors, fumes), (3) pollution (dust, smoke, moisture particles from other persons' breaths), (4) unnatural temperature-humidity relations, and (5) stagnation. Of these, stagnation probably does the most damage to the largest number of persons, since quiet, still, "dead" air fails to promote evaporations from the surface of the skin, and to stimulate the sensory nerve endings located in the skin, both of which are necessary to maintain a good circulation of the blood. This good circulation is especially needed for a large class of workers while engaged in their various trade processes. The essential difference between indoor and outdoor air is that the former is usually still, quiet, or "dead", while the latter is in motion, is fresh, and "alive". If to stagnation are added any of the other four conditions above mentioned, as is often the case in work places, the danger to health is much increased.

Probably, abnormal temperature-humidity relations are next in hazard to stagnation as deleterious factors, although the physiology of the human organism can adapt itself to quite wide variations in these if the air can be kept in motion. A person can exist (at least experimentally) in comparative comfort in a closed-up closet for a considerable time if these last mentioned features — *temperature 68°, humidity (relative) 60°*, and a *motion of the air*, as by fans — are provided for. It has been practically established that it is not the amount of oxygen which persons use up in breathing, nor the amount of carbon-dioxide they exhale, nor the emanations from the human body (except moisture particles from the coughing, spitting or sneezing of diseased persons in crowded quarters) which count for aught in vitiating the air, except under the most unusual conditions of crowding or confinement.

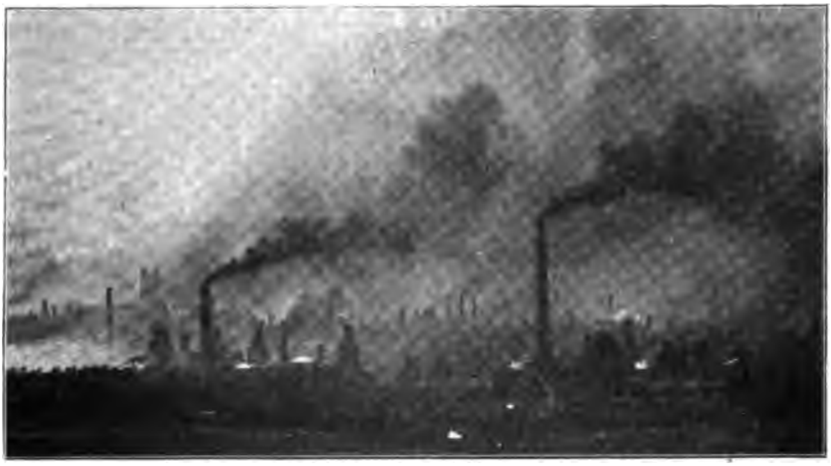

FIG. 11. SMOKE NUISANCE.
No fresh air possible within work places in this district.

There is a difference between the air of many work quarters, however, than that of homes, schools, offices, stores, etc. In shops, factories, mills, and many other establishments there are the ever-present air *vitiators* such as free flames without vents, gas heaters, salamanders, furnaces, gases from tanks and vats, and chemical vapors which are not confined or led away from the breathing atmosphere. To these are multitudes of wage-earners exposed as well as to air stagnation and temperature-humidity factors. Practically all such vitiation can be corrected by various types of confining cupboards and enclosures, and by artificial ventilating systems, air-agitators, suction fans, etc.

Of all factors which tend to promote high death rates, particularly from the preventable causes, such as tuberculosis, pneumonia, bronchitis, and the like, atmosphere which is not that supplied by nature, is paramount. We might say, in a word, that if the out-door air could be breathed by workers in all lines of activity throughout the work hours of the day, the preventable, degenerative and occupa-

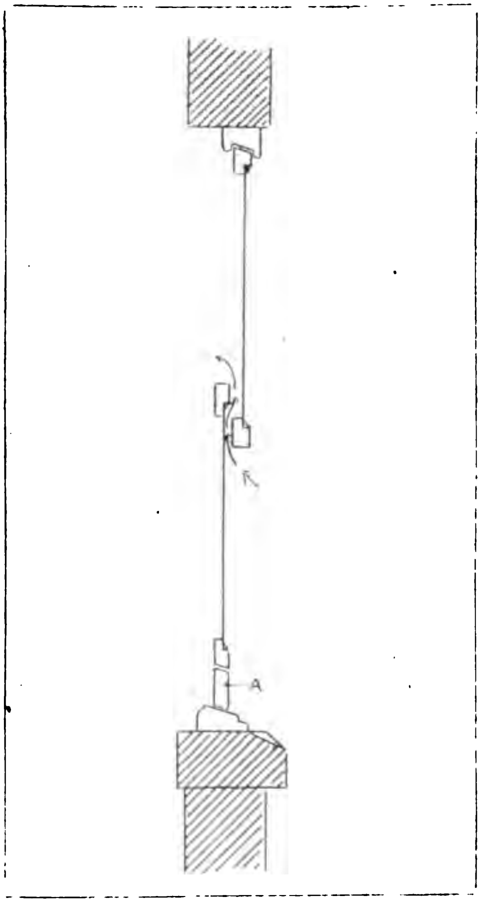

FIG. 12. TO CONVERT AN ORDINARY SASH WINDOW INTO A VENTILATOR.

Insert a board under bottom sash. It will be found that fresh air from outside will find its way into the room as indicated, with very little, if any, draft. This is a useful method for many workshops.

tional diseases would be almost entirely done away with. In this respect, the person in a clerical position is just as much concerned as the operative in a factory or mill.

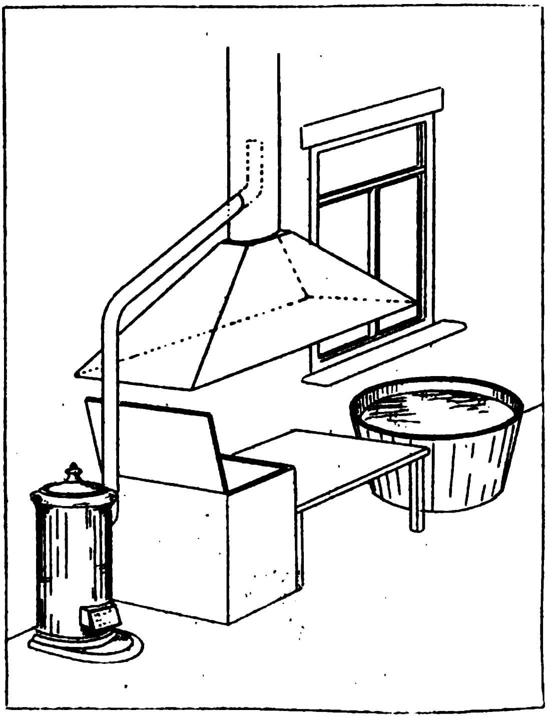

FIG. 12. THE ELEMENTS OF EXHAUST VENTILATION.

To collect the dust, vapors, or fumes which may arise from work processes a hood with stack is provided. The exhaust may be created by draft from a stove pipe (as shown), or a steam jet, or exhaust fan, or connection to a chimney of sufficient height.

HEAT.—The exposure to heat produces prostration, heat exhaustion, muscular cramps and acute colic when the effects are extreme, while in the long run it produces anemia, catarrh, rheumatism, Bright's disease, skin eruptions, gradual fibrosis and premature old age. Its effect upon the eyes has been commented upon under the head of DARKNESS. Many persons who are exposed to heat should wear glasses as much for protection against the heat as against the unnatural light which accompanies it. The raising of the body temperature, *thermic fever,* which takes place more or less constantly among heat-exposed workers, is accompanied by the production and accumulation of definite poisons or toxins within the body, which are

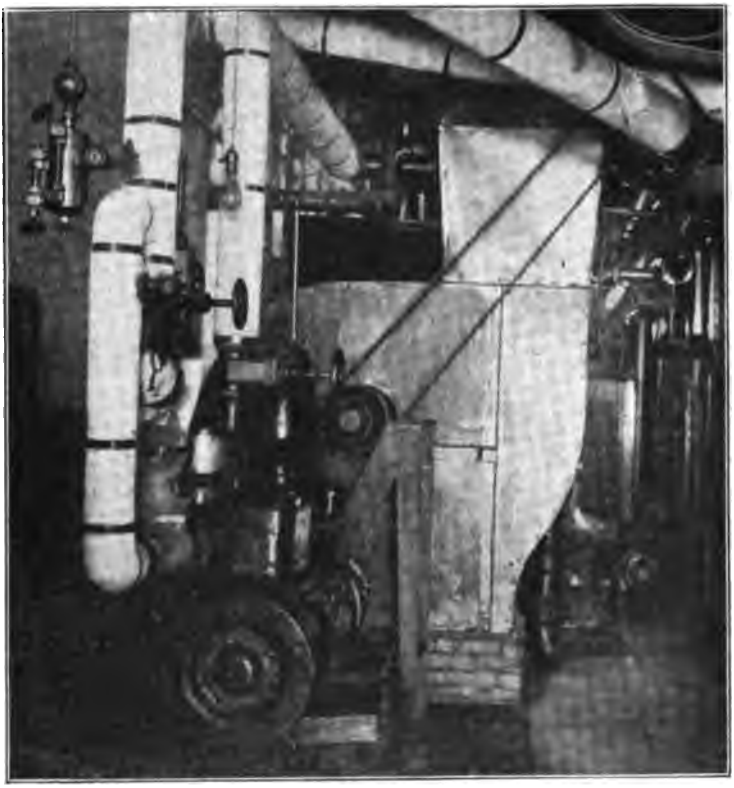

FIG. 14. AIR-CONDITIONING APPARATUS FOR FACTORY VENTILATION.

This machine washes, strains, humidifies, heats and cools the air as well as forces its circulation. It maintains the dew point within 1° of a fixed point for three floors in a large factory building.

responsible for the effects above noted. Hence he who shows effects of exposure to heat has been occupationally poisoned although the poison in this case has been elaborated within his own system. If combined with moisture, the effects upon health are still worse, since the failure of opportunity for the evaporation of the normal perspiration on the surface of the body is interfered with, thus disturbing, seriously, the heat-regulating mechanism.

In practically all trade-processes heat can be kept away from workmen, or means can be adopted to nullify its effects. The adoption of modern appliances for handling and transporting heated materials has done much in certain industries to solve this question. In addition, the use of shields and screens; of asbestos coverings; of water-cooled furnace doors; and particularly of airblasts, sufficiently strong to blow back the heat currents, or, in some cases, to blow upon the exposed workman; the adoption of powerful electric fans; of water sprays; and so on, have done much toward helping it. Finally, we would mention particularly the short work day, and the frequent rest period, also the wearing of garments arranged to protect from the heat, but at the same time permit of evaporation. Then, one of the most important necessities for the use of all heat-exposed workers is the shower bath. There is a good physiologic reason for this.

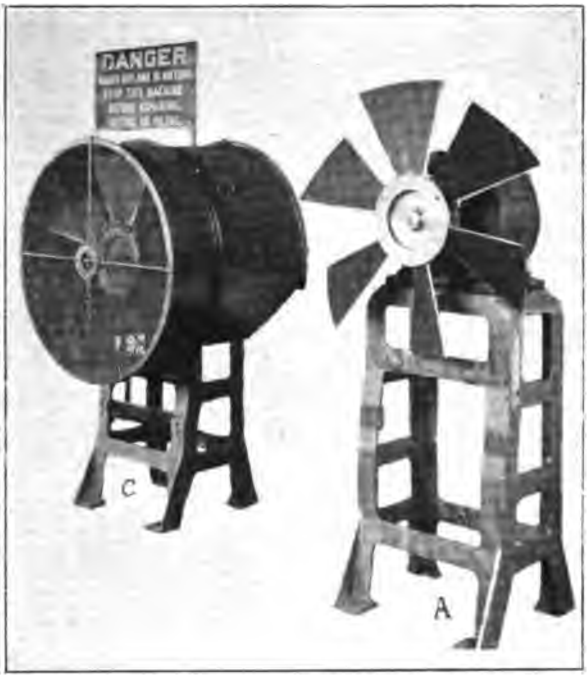

FIG. 15. ELECTRIC FAN.

Portable ventilating fan shown at "C" with fan motor completely covered and "A" with shields removed. These fans are 36" in diameter and are used where men work in high temperatures, and can be moved to suit conditions and obtain the best results.

which in plain terms may be stated to be that it tones up the pores (sweat glands) of the skin, decreases the perspiration, and re-establishes the circulation equally throughout the system. We may add to this that it cleanses the person and adds to the psychological effect which comes with self-respect, which in turn promotes health. Such bathing facilities will cut down rheumatism, lumbago, stiff joints, colds, sore throat, etc., to a marked degree. It must not be forgotten that a person whose back muscles are full of "heat-toxins", which have not been properly removed by a good circulation, will, on the next day, when he returns to work, and upon slight straining effort, develop an acute "kink" in the back muscles, which becomes a lumbago that is as disabling, and takes as long to cure in many cases, as a broken hip. In connection with the shower bath, we would mention the necessity of providing, not a cold stone or cement floor upon which to step, but wooden treads or slats. Also all workers exposed to this hazard should, by all means, have a double set of lockers, one for street clothes, and one for work clothes, this latter arranged so that warm, dry air may dry out the clothing between work periods.

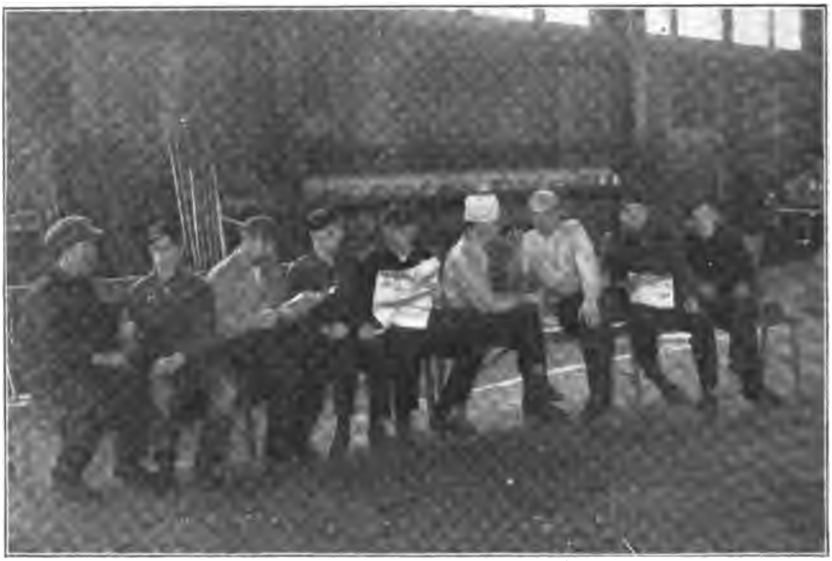

FIG. 16. THE REST INTERVAL FOR HOT PROCESS WORKERS.

Protection against heat. Men enjoying a fifteen minute rest between working spells at hot processes. These men are relieved in this manner every fifteen minutes while working in excessive heat.

COLD. — Working in the cold cannot be said to be dangerous to health. One or two qualifications should be made: the worker should get enough exercise to stimulate circulation, he should be properly clothed, and should not be subjected to alternations of cold exposures with heat exposures. This is where the damage to health is done in the case of most workers so exposed. Human beings work in the frigid zones and keep perfect health. Combinations, however, of cold with hazards such as dampness, darkness and vitiated air, are, of course, decidedly injurious.

A bad feature in many hot processes is that workers are exposed to all manner of cold drafts, especially during rest intervals and in the winter season. In this over-heated state they often step out of doors and sit down upon benches without putting on additional clothing. Oftentimes they are compelled to go to an outside privy or through cold halls and area ways to toilets located perhaps in damp cold basements.

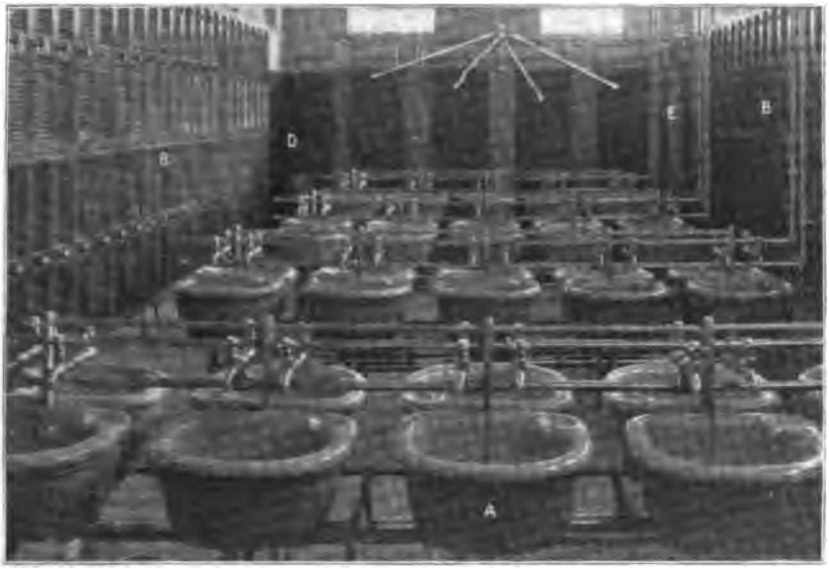

FIG. 17. SANITARY PROVISIONS IN A MODERN STEEL WORKS.

In the rear are shower baths and, around sides, lockers with fronts permitting air circulation. (Shower) baths are a physiological necessity to all workers in hot processes.

(To be continued.)

GENERAL PROCESSES.

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Division of Occupational Diseases, Ohio State Board of Health.

(Continued.)

METAL GRINDING.

The process of metal grinding is one closely associated with foundry work and assembling processes upon both iron and soft metals. It properly includes also the dressing of castings by other means than grinding, such as "sandblasting," "rattling" in tumbling machines, and "chipping" by means of steel tools. Sandblasting has been considered elsewhere, while a word will be given here to each of the other subsiduary processes. Metal grinding is usually performed with emery wheels, which may be stationary, or may be moved about over large surfaces by means of a swing-belt attachment. Occasionally it is done mechanically by a series of traveling emery wheels, which pass up and down over the surfaces to be ground. Sometimes it is done by belts covered with emery or other exceedingly hard abrasive substances. Carborundum and corundum, two substances of diamond-like hardness, are the chief abrasives used.

The process was investigated in 64 establishments, employing a total of 1,979 wage-earners, all males. Modern methods appeared to obtain in 42 places, fairly so in 14 more, but were crude compared to other places in the remaining 8. In but few places were the workers members of a union. The general attitude of employers toward this class of employes appeared good in 45 places, fair in 17 more, and poor in the remaining 2. A fairly intelligent class of workers were employed in 36 places, while more or less ignorant foreigners, often non-English speaking, were employed in the remainder. A fair percentage of the workers were comparatively old-time employes in 48 places, while the personnel appeared to change very often in 13 places (the remaining 3 were not reported upon). Health appliances, especially those consisting of blower systems to remove the dusts created, were good in 20 places, of only partial efficiency in 13 places, and absent in the remaining 31. These latter were places where workers were employed either on traveling belt grinders, which they steered about, and which were difficult to protect, or were engaged at the process for only a part of their time, as, for instance, stove-mounters. Definite instructions regarding the health-hazards of the work were given in an organized way in 8 places, and fairly well in 2 more, but the remaining 54 very little thought was given to the effect which the work might be having upon the health of the workers, and in a number of places very little attention was given to the efficiency of the blower systems present. In 8 places the workers were members of sick benefit associations, conducted by the industry itself. The work was considered skilled in 7 places, semi-skilled in 15 more, while entirely unskilled labor performed it in the remaining 42 places. The workroom quarters were hygienically constructed in 27 places, fairly so in 12 more, and not so in 21 (the remaining 4 not being reported upon in this regard). In 20 places other processes than metal grinding were carried on in the same quarters, such as Sandblasting, Machine Shopping, Foundry Processes, Forging and Smithing, Welding, Brazing, Furnacing, and Polishing and Buffing. The age-group estimations summed up as follows:

Age Groups.	*No. of Wage-Earners.*
Over 50 years	19
45 to 50 years	20
40 to 45 years	104
20 to 40 years	1,808
Under 20 years	82

The process was investigated in 16 different industries, arranged in descending order (by number of places investigated) as follows: Foundry and Machine Shop Products, 11; Cutlery and Tools, 11; Brass and Bronze Products, 7; Automobiles and Parts, 6; Iron and Steel Mills, 4; Stoves and Furnaces, 4 (this was also separately investigated in the stove-mounting rooms in a total of 15 establishments); Agricultural Implements, 4; Musical Instruments, 3; Steel Springs, 3; Scales and Balances, 2; Electrical Apparatus, 2; Electroplating, 2; Coffins and Burial Cases, 2; and Sewing Machines, Safes and Vaults, and Files, each 1.

Vital Statistics for Metal Grinders are not given separate classification in the State reports. In this connection it is probable that country-wide statistics would be much more accurate, both because the larger number of deaths concerned, and because persons with bronchial or respiratory diseases have a strong tendency to migrate to western states. In this connection we publish the following, taken from a report submitted by the Stove Mounters' International Union (United States and Canada). These workers are engaged about one-fifth of their time in metal grinding, usually without any protective devices, while they are in an atmosphere more or less contaminated with the fine dust created most of the time.

Figures submitted by the Secretary-Treasurer of the Stove Mounters' International Union for death benefits paid in the United States and Canada for the past 5 years, show the four leading causes of death and percentages as follows:

CAUSE OF DEATH AND PERCENT FROM EACH DISEASE AMONG STOVE MOUNTERS TO WHOM DEATH BENEFITS HAVE BEEN PAID BY THEIR ORGANIZATION DURING THE PAST FIVE YEARS IN THE UNITED STATES AND CANADA (UNDER DATE OF SEPTEMBER 17, 1914).

Tuberculosis	27.95%
Heart Disease	20.93%
Accidental Deaths	11.67%
Pneumonia	9.31%

The remaining deaths were as follows:

Deaths due to Preventable Causes	13.88
Deaths due to Degenerative Diseases	9.23
All other Deaths	7.03
Total	100.00

The total deaths chargeable to lung diseases was 43.5%.

The hazard of breathing *dust* from the process was determined as negligible in 9 places, of a fair risk to the average worker in 24 places, and bad in the remaining 31. This dust was invariably of a most harmful character because of its hardness, crystalline character, and fineness, making it easy of inhalation and swallowing. In 12 places quarters were kept *clean* and *orderly,* fairly so in 17 more, and not so in the remaining 35. Methods of cleaning were oftentimes at fault; such, for instance, as dry sweeping or brushing up during work hours. Only dirt floors were present in some places, and in others, floors, walls and ceilings were of such construction as to make them very difficult to keep clean. Workers were found engaged in very *damp* quarters in 6 places, and fairly so in 4 others. Sometimes the water used in connection with the grinding process was the cause of the dampness. There seemed to be a tendency to put metal grinding in *dark* quarters. In 12 places this was especially noticeable, while light was inefficient in at least 13 more. In many of the 39 remaining the light would have been efficient, providing windows and skylights were kept reasonably clean. *Heat* was a negligible factor in the process itself, but in 5 places workers were exposed to this hazard from their proximity to furnaces and other hot processes. While heating was frequently done by stoves and indoor furnaces, occasionally the ordinary salamanders filled with coke were used, without stack and hood to remove fumes. In at least 5 places entirely inefficient heating methods were justly complained of, particularly for workers who stood or sat still all day with their backs toward windows, or drafty areaways. The general room *ventilation* of grinding quarters was good in 12 places, fair in 39 more, and bad in 21 (the remaining 2 not being reported upon). This feature in about one-third of the places, however, was influenced by the nature of other processes present, particularly founding, forging, and the like. In many instances these workers were exposed to foundry and cupola smoke, core-oven fumes, etc. Occasionally workers were just as much subject to brass fumes and "brass chills" as were the brass founders themselves. *Fatigue* was considered a bad hazard in 31 places, and fairly so in 29 more, the chief features arranged in descending order of importance being: monotonous application and reduplication of movements, 26; hurrying piece-work, 24; constant standing (still), 19; loud noises, 13; speeding up, 6; jarring processes, 6; laborious work, 5; faulty postures long maintained, many; seats without back rests, many; long hours, several; constant pressure of the body against objects, many. In 4 places work arrangements were adjusted to permit variation and recreation. For a large percentage of workers, especially those engaged upon small pieces, *inactivity* was a considerable hazard. The workday was 8 hours in 2 places, 8 to 9 hours in 13 places, 9 to 10 hours in 44 places, and 10½ hours in 1 place. The noon recess was 1 hour in 13 places, ¾ hour in 6 places, and ½ hour in 45 places Overtime was an occasional feature. A morning lunch hour or respite from work was seldom observed, although piece-workers suited themselves about this. The liability to the contraction of *communicable diseases* was a considerable hazard in 31 places, fairly so in 21 more, negligible in 8, and not reported upon in the remaining 4. While the whole gamut of hazards as listed in Parts II. and III. was encountered here, the chief ones were: promiscuous spitting upon the dusty floors, the absence of cuspidors, use of common drinking cups, inadequate or absent washing facilities, poor closets, crowding together of workers in a small space in the room, and the lack of medical supervision (particularly to keep consumptive workers from endangering others). Liability to *poisoning* existed in 17 places, and especially so in 9, due to work upon lead, lead alloys, and the breathing of brass fumes. Where lead is over 5% in an alloy, the dust from such alloy may produce lead poisoning. Most brasses and bronzes do not exceed this. The industrial inducement to *alcoholism* appeared negligible in 7 places, a subject for consideration in 34 places, and a decided hazard in 23, due, in addition to the depressing influences of the various hazards above cited, to the inadequacy of proper drinking water facilities. While any place employing a large number of workmen would be almost certain to have *some who appeared* below par in health, this was particularly so among a relatively large number of employes in 13 places, and more or less so in 31 more. In 25 of the establishments visited the workers made *complaints*, which were worthy of notice. These consisted chiefly of the constant breathing of dust, causing all manner of nose, throat, bronchial and lung troubles, as well as dyspepsia, bowel trouble, and middle ear gatherings. Most of the complaints concerned general sanitary matters, and occasionally the breathing of fumes, vapors and smoke from other processes. In 17 plants the investigators came across 24 cases of *industrial sickness*, as follows: Chronic Lead Poisoning, 5; Pulmonary Siderosis, 5 positive and 4 tentative; frequent attacks of Brass Poisoning, 2; Bronchitis, 2; Tuberculosis, 2; Pneumonia, 1; Tubercular Empyema, 1; Brush burns of the hands, 1; Conjunctivitis, 1. As stated under Factory Processes, here too, the vast majority of such cases are in hospitals, dispensaries and various institutions, or at home, to which the existing system of morbidity statistics does not extend to any degree of efficiency at the present time. (See, however, Part II. and Part VI.)

Comments.—Our analyses show that only 5 plants could be considered entirely healthy places in which to work. The better control of the dust (in 11 places no attempts whatever were made to control it) is the first essential, while shorter work hours, alternation of work to overcome monotony, and the features mentioned under the respective hazards above, as well as medical examination and supervision are necessary to control health in this entirely unnatural and hazardous process. The wearing of a piece of board or metal prevents harmful pressure against the person.

TUMBLING consists in placing a number of castings (usually small ones) in a revolving cylinder, called a "rattler", in order to shake mold dust off of them, as well as to smooth down certain imperfections. The cylinder, which should be entirely enclosed, since it creates an immense amount of dust, was found not to be so in a number of instances. However, in some places, a very efficient air exhaust or blast system controlled all dust arising therefrom. The process is very noisy.

CHIPPING of iron and steel castings is another exceedingly dusty and also dangerous procedure from the flying particles which are created by the use of both hand or pneumatic tools, and from which a considerable part of the 1,220 working men (this was the number compensated for) lost their eyesight in the State in the year 1913. Outside of the use of respirators, individual goggles (to prevent the spread of eye diseases), and cotton in the ears, it is exceedingly difficult to protect the workers in this procedure. Where pneumatic tools are used the noise is deafening, while the shocks produced to the nervous system by holding the tools is most damaging. Short hours, work variations, physical examination upon employment, and medical supervision, should be instituted.

SAND BLASTING.

Sand blasting is a process in which fine sand or similar hard substance is forced through a pipe by compressed air against objects either for the purpose of cleaning their surfaces or of giving them an etched, frosted or rough effect. Hence, the process is used upon a considerable variety of materials. As it is very rapid, usually only a few workers are so employed even in very large establishments.

Our investigations covered the process in 9 different industries, viz., Automobiles, Cars, Carriages, Electrical Apparatus, Brass, Iron, Glass, Cutlery and Tools, and Machine Manufacture. There were 51 wage-earners, all males, found so employed. For some work, considerable skill is necessary, but in the majority of instances it is a process for unskilled labor. Retention at the process was good in 3 places, fair in 3, and very brief in the remaining 3. Health appliances, consisting of isolation of the process in a room by itself and within a cupboard through which the worker inserted his hands, or the wearing of a helmet covering the entire head, — these features were found good in 3 places, fair in 3, and practically absent in the remaining 3. Instructions to limit the dust in order to conserve the health of the worker were good in 5 places, but very little attention was paid to the same in the remaining 4. In but 1 place did the workers enjoy the privilege of a sick benefit association. The work was done in the same quarters with other processes in 3 instances, so that other

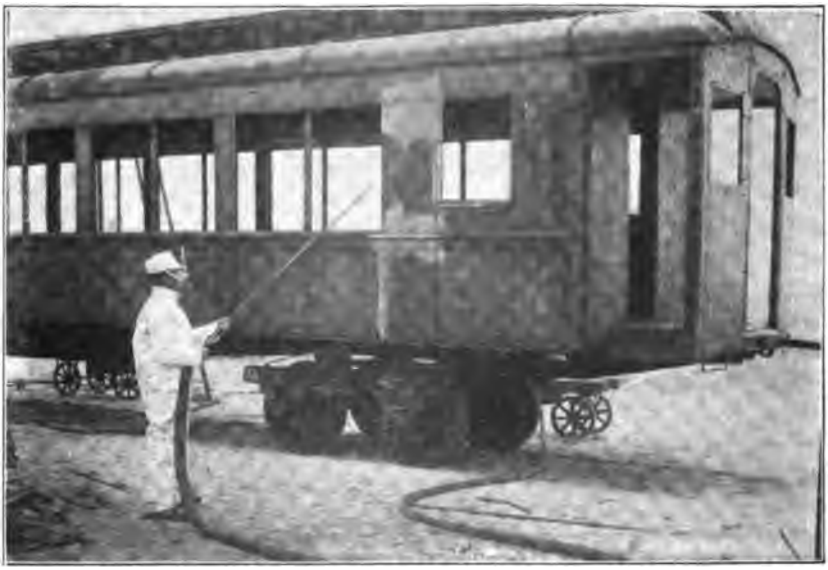

FIG. 40. SANDBLASTING.

The worker needs protection from breathing fine dust incident to this class of work, even though it is done out-of-doors. Note besides respirator, special suit and cap.

workers were exposed to the fine dust created. Of all the employes, 13 were over 40 years of age and 38 under 40.

Dust in the breathing atmosphere was a negligible factor in 2 places, a fair hazard in 4, and bad in 3. Cleanliness of quarters took about the same proportions. *Dampness* was no feature of the process, nor were harmful *light* effects. *Heat,* due to the proximity to other processes as a rule, was bad in 1 place, fair in 2 more, and no feature in the remaining 6. *Cold* weather, due to performing the work, protected only by a roof, was a feature in 2 places. *Fatigue* was not a special hazard, although hurrying piecework, monotony, and constant standing were features in ⅓ of the places. The workday was from 9 to 10 hours in all places. The noon recess was 1 hour in 1 place, ¾ hour in 3, and ½ hour in 5 places. The liability to the contracting of *communicable diseases* was negligible in 3 places, a fair risk in 5, and bad in 1, due, principally, to the breathing of fine dust in quarters where there was promiscuous spitting, absence of cuspidors, inadequate washing facilities and improper closets, and the failure to inquire into the fitness of the workers for such work. Poisoning was no feature. The general factors favoring *stimulantism* were the irritating effects of fine dust inhaled and swallowed, and the absence of good drinking water facilities in some places. The health *appearance* of the workers was not good in ⅓ of the places. The workers' *complaints* were the breathing of dust, skin irritation in hot weather, and the inefficiency of some of the hoods used, while in 1 place the manager said they were having it done at night, because it made so much dust! *Comments.* — Such work should be done in a manner to keep the dust away from the employe, such as confining the process within an impervious cupboard, through which armholes are made, or having it done in a dust-tight room in which the worker should be supplied with an impervious suit and helmet to which is attached an air tube supplying him with fresh outdoor air under pressure. The simple wearing of respirators, even of helmets, without such air tubes is not at all efficient, as can be demonstrated by noting the amount of fine dust settled upon the workmen's features when such coverings are removed. Many places substitute sandblasting by cleaning small pieces in a rattler. For large work, the Wedemeyer sand blast rooms should be investigated.

POLISHING AND BUFFING.

The processes of Polishing and Buffing are so similar and work is so often interchanged that they are considered together. Polishing is done on emery wheels, or spindles covered with a composition of abrasive material, which gives a smoothness to castings much in advance of that secured by metal grinding, where the action is rougher. Buffing is a follow-up process which glosses the metal parts still further after they have been polished. Buffing is usually done with wheels composed of layers of fabrics tightly compressed and sometimes infiltrated with finely abrasive powders.

The process was investigated in 51 plants, located in 11 cities, and employing a total of 864 wage-earners, all but 2 of whom were males. The number of employes varied from 2 to 125 in a single plant. The females were engaged in a fibre comb factory.

The industries in which this process was investigated were as follows: Brass and Bronze Products, 15; Electrical Apparatus, 5; Mirror Making, 5; Cash Registers, 3; Stoves and Furnaces, 3; Foundry and Machine Shop Products, 3; Coffin Fixtures, 3; Cutlery and Tools, 3; Copper, Tin and Sheet

Metal Goods, 2; and 1 each of the following — Automobiles and Parts; Jewelry; Regalia; Scales and Balances; Sewing Machines and Parts; Scientific Instruments; Fibre Combs; Aluminum Combs; Signs and Advertising Novelties. The metals or alloys usually worked upon were brass, bronze, aluminum, lead and nickel plated objects.

The State Vital Statistics do not give sufficient reports to include here, but the following is taken from a report submitted by the General Secretary-Treasurer of the Metal Polishers, Buffers, Platers, Brass and Silver Workers Union of North America:

Of 197 deaths which occurred among Polishers and Buffers in the five-year period from June 1st, 1909, to May 31st, 1914, according to the record of death claims paid, the chief causes of death and the percentages were: —

POLISHERS AND BUFFERS.

Cause of Death.	*No. of Cases.*	*Percentage.*
Tuberculosis	65	33.0
Pneumonia	26	13.2
Heart Disease	22	11.1
Violence (including 6 suicides)	16	8.1
Other preventable deaths	14	7.1
Other deaths from degenerative diseases	47	23.9
Permissible deaths	7	3.6
Total	197	100.0

The average (median) age at death of these 197 workers was 39.7 years.

Three of the plants visited were union places, the balance being non-union or open shop. The employers' interest in employes' welfare appeared good in 30 places, fair in 10, and poor in 7, the remaining 4 not being reported upon. An intelligent type of workers was found in 38 places, fairly so in 8 more, and ignorant foreigners in the remaining. There was a good degree of steadiness at the trade in 35 places, fairly so in 12 more, and not so in the remaining 4. Health appliances, consisting of blower systems to remove dust, lint, etc., from the process, were present in 38 places where needed, and absent in 4 (brass, combs, coffins, jewelry). In 19 of the places where they were present, they were not efficient; occasionally they were not in working order at all. Occasionally other appliances to improve room ventilation were also found. In 3 places organized instructions concerning the conservation of health were well given, and some attention was directed to this in 3 more. In 3 places the wage-earners enjoyed the privileges of sick benefit associations. The general construction of work quarters was hygienically good in 15 places, fairly so in 9 more, but not so in the remaining 27. In 22 places other processes were also being carried on in the same quarters, such as Electroplating, Machine Shopping, General Factory Processes, Founding, Lacquering, Metal Grinding, Soldering, Glass Melting, and Tinning.

Dust in the breathing atmosphere was a negligible hazard in 12 places, fairly so in 17 more, but was bad in the remaining 22. It consisted chiefly of iron, steel, brass and bronze alloys, other soft metals, glass, etc., which were being worked upon, as well as the components of the polishing wheels (emery, silica, etc.) and of the buffing wheels (cotton and lint fibres, glue substances, etc.). In some places it was kicked up from the floors because of inefficient cleaning, and also dry sweeping during work hours. These dusts are of course the most harmful to which workers may be subjected, since they are exceedingly hard, crystalline, and very fine, or irritating, and, in the majority of instances, poisonous. There are so many consumptives in the trade that the infection factor is also added. The general cleanliness of quarters was determined as good in 15 places, fairly so in 15 more, and not so in the remaining 21. This usually was due to negligence in cleaning up, but oftentimes also to the type of quarters occupied. In many such places windows and skylights were apparently very seldom cleaned, or walls painted or whitewashed. In 7 places *dampness* and poor light were hazards. General room *ventilation* was very good in 16 places, fairly so in 17 more, but close and confined, and often contaminated with various fumes and gases from other processes in the remaining 18. In but 2 places were workers exposed to *heat,* and here it was not bad. In practically all places polishers and buffers were subject to the effects of *fatigue,* and particularly so in 22. The chief reasons for this were steady, monotonous piece-work under

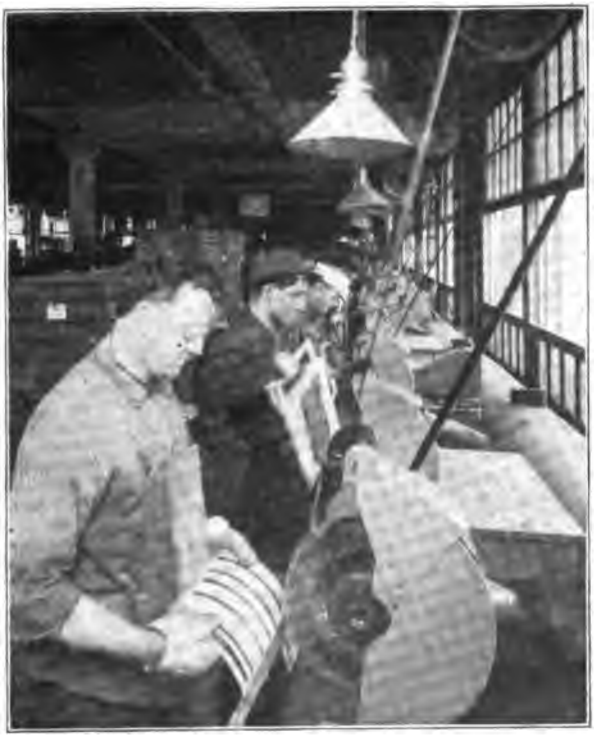

FIG. 41. BUFFING METALS.

Note goggles, gloves, chest protector, good natural and artificial light, as well as ventilating system.

constant application and considerable strain with eyes and body almost rigidly fixed for a total of hours at a time throughout the day. Constant standing in partially stooped postures with very little variation were also other hazards. The workday was found to be 8 hours in 1 place, 8 to 9 hours in 14 places, 9 to 10 hours in 30 places, and 10 to 11 hours in 2 places. The noon recess was 1 hour in 11 places, ¾ hour in 7 places, and ½ hour in the remaining 33. The question of other recesses was very largely a matter of the workman's own choice, since they were employed at piece-work. The liability to the contraction of *communicable diseases* was great in 24 places, and considerable in at least 18 more, due particularly to promiscuous spitting on dusty floors and the absence of cuspidors, while in a fair percentage of places washing facilities were absent or very inadequate; often closets were poor and common cups used by all workers for drinking purposes. In some places workers were unduly crowded together. Occasionally, some were seen who were wearing respirators and endeavoring by this means to filter out the dust from the air which they inhaled. Liability to industrial *poisoning* existed in 38 of the plants visited, and especially so in 21. This was due in about half of the instances to the presence of other processes (see those mentioned above), in the balance it was due to working upon poisonous metals and alloys, particularly those composed of lead, or rich in lead component. The various poisons mentioned to which polishers and buffers were found subjected were lead, potassium cyanid, nitric acid fumes, phenol, amyl acetate, benzine; alum, crude paraffin, and "metal dust", furnace gas fumes, brass fumes, plating fumes, and acid-dipping fumes. The exposures varied greatly as to frequency, amount and workplace. The industrial inducement to *alcoholism* and to other forms of *stimulantism* were considered a marked hazard in 12 places, and more or less so in nearly all of the balance, based chiefly upon the fatigue factor concerned, the dust breathed, and the opportunities for slow poisoning.

However, in 24 plants the general health *appearance* of the workers was good, in 14 it was determined as fair, and in 13 bad. The principal *complaints* of the workers were monotony, danger, metal dust, acid fumes, blowers and exhausts inefficient, and poor sanitary arrangements, while their more personal complaints were coughs, indigestion, rheumatism, and skin affections. Investigators encountered 17 cases of *industrial diseases* in 8 plants as follows: chronic lead poisoning, 5 positive, 1 tentative, and 1 past; brass poisoning, 1 positive, 1 tentative, and 6 with "brass itch"; severe bronchial affections were particularly mentioned in 2 instances.

Comments.—As the constant breathing of harmful dust and the continual assuming of unnatural and strained postures are foreign to the physiology of the human organism, it is highly necessary that dust be kept out of the breathing atmosphere and to introduce measures which will vary the work for this class of workers. Unfortunately, it is looked upon as a skilled trade and this makes it difficult to introduce work variations. This does not detract, however, from its hazardous character. The toll of deaths from preventable causes bears this out. It is a process of modern times. One point which particularly impressed our investigators was that where blower systems were intalled they were often very inefficient at the time of inspection and were said to be so most of the time. There appears to be but one way of getting around this—to make it somebody's business in each such room to see that such systems are in working order and to provide for compensation for this purpose. A metal or wooden "chest-protector" prevents harmful pressure against the person. Other features, the liability to poisoning, etc., require the same precautions as elsewhere. Especially should medical supervision be adopted for this class of workers, as they are at a process which appears to take about 20 or 25 years off of their lives.

(*To be continued.*)

EDITORIAL SECTION.

The Tuberculosis Problem.

Among the many excellent papers presented during the Forty-first Conference of Municipal Health Authorities, held in Columbus in January, was one dealing with the tuberculosis problem by Dr. J. H. Landis, the efficient health officer of Cincinnati. This paper appears elsewhere in this issue of the Journal and it is our opinion that no health official in the state can afford not to give his closest attention to what Dr. Landis has to say on this subject. He has pointed out in his usual trenchant style the many and complicated obstacles in the way of an early control over the disease. His conclusions may seem to be "radical" to some readers, but heroic measures are necessary if we are ever to gain the ascendency over the "Great White Plague." We believe, however, that Dr. Landis has not placed sufficient emphasis upon the educational work that is and can be done through the public health nurse. The formation of a secure and lasting public opinion concerning the measures to be taken for the control of tuberculosis can only come through a staff of public health nurses. The staff should have sufficient nurses to cover a given territory thoroughly and and should be highly trained to view the individual patients, not as medical cases, but as symptoms of the disease that is gnawing at the very heart of the community. The work which such nurses do in the homes day after day is the sort which is laying the firm foundation for our ultimate solution of this great and perplexing problem.

* * *

The Inefficiency of Public Health Administration in Ohio.

In studying the pollution of the Ohio River representatives of the United States Public Health Service found it necessary to include a survey of all towns situated thereon. Dr. W. H. Frost, who is in charge of the investigations, summarizes the results of this survey in the current number of the Lancet-Clinic. He concludes with this statement: "No one fact brought out in the course of our survey of Ohio River cities has been so striking as the absolute lack of efficient municipal sanitary administration in the smaller cities, even those of sufficient size to support full effective organizations." Had he pursued the matter further he might have pointed out that the health administration in all health districts bordering on the Ohio River, irrespective of their size, was just as inefficient as that in the smaller cities. It is a fact not generally realized, that outside of a few of the larger cities of the state, the local health administration is quite insufficient for the needs of the populace.

A democratic form of government is supposed to mean equal opportunity, equal privilege and an equal amount of liberty for all persons. Equal opportunity means that no class of citizens shall have greater facilities in the pursuit of their ideals than others. Yet in Ohio the citizens of the larger municipalities certainly enjoy a greater freedom from preventable disease than do citizens of villages and townships. The citizen of Cleveland or Cincinnati or Columbus knows he can depend upon the purity and safety of the milk and water he uses. He relies upon the fact that the meat he consumes is free from dangerous bacteria and poisons. When he sends his children to school he knows that they will not be exposed to cases of diphtheria, scarlet fever, measles or other dangerous diseases. The citizen of a village or township cannot rely upon the safety of his food and drink, nor can he rely upon a measure of protection for his children in shool. The inequality of health administration in Ohio is a reproach to the state and is due almost wholly to the very small units which comprise health districts. The recommendations of the State Board of Health which seek to correct this condition have not been received with marked favor by the General Assembly now in session. The larger the district the more efficient the health administration as a rule. The means to improve the public health service in Ohio is to enlarge the unit, and remove local departments wholly from the sphere of politics. Health administration is the foundation of public health work and it is necessary to build the foundation aright.

* * *

Immunity.

During the last twenty-five years marked progress has been made in our knowledge of the phenomena of infection and immunity to disease. Many of the older theories which sought to explain the underlying factors of resistance to disease have been done away with. A vast amount of accurate knowledge has been accumulated along these lines. The principles underlying infection and immunity have in many instances been very carefuly worked out. A new science has been developed called immuniology. The field of immuniology is exceedingly broad and it will be probably many years before exact and detailed information is at hand dealing with all the underlying processes in connection with bodily resistance. It is, of course, obvious that any comprehensive idea of immuniology must be predicated upon a clear understanding of the foundation principles and the micro-organisms concerned in infection.

In the two preceding numbers of this publication there has been printed a brief review of the subject of the methods and channels of infection. In this issue there begins a series of articles on immunity and susceptibility. These articles are not written from the highly technical standpoint and are not to be regarded in any sense as exhaustive treatises on the subject. The aim has been to present certain of the fundamental facts of immuniology in a semi-popular style in order that the subject may be clearly comprehended by the average layman and student of biological science.

Public health work deals primarily with the prevention of disease. If one is to successfully combat disease and prevent the development of infectious microörganisms within the body, it is essential that the resistance or immunity of that body be maintained to a very high degree. Immunity or resistance may be lowered in many ways and during the period of such lowered resistance serious infections may occur. It is within the province of public health work to provide ways and means of keeping the bodily resistance at the highest point possible in order that the incidence of disease may be prevented. It is hoped that the series of articles on this subject have proved interesting and instructive and that a fairly comprehensive idea of the underlying mechanisms and phenomena may be acquired.

* * *

The Operation of Sewage Treatment Plants.

The most important feature interfering with the efficiency of sewage treatment plants is the failure on the part of the authorities in charge of such plants to provide for their proper operation and maintenance. During recent years great progress has been made in the development of methods of sewage treatment and at the present time many communities are provided with plants to prevent the pollution of streams. These involve a considerable outlay of funds, in many cases exceeding the amount required for any other single municipal improvement. Sound business principles, if not public health considerations, require the proper care and maintenance of such plants. However, experience has shown that municipal authorities are prone to neglect sewage treatment plants and their rapid deterioration results. This brings about inefficiency of the treatment and a failure to secure the benefits which would ordinarily be expected as a result of the expenditure. These unfortunate experiences have tended to indicate to the average citizen the uselessness of attempting to correct stream pollution by the installation of sewage treatment plants. It must be recognized that the proper operation of works for this purpose is of great importance, perhaps more so than the design of the plant.

Various state health departments have attempted to improve the operation of sewage treatment plants in their respective states and not without a certain degree of success. It is, however, impossible for state health departments, as ordinarily organized, to directly control this important work and the proper realization by the municipal officials of the necessity of providing for careful maintenance of sewage treat- through its sanitary engineering and laboratory sections has committees ment plants is necessary. The American Public Health Association appointed to study methods of operation of sewage treatment plants with the object of bringing about more proper attention to this work.

The officials of every municipality which has installed a plant for sewage treatment should give careful consideration to the question of proper operation and maintenance of the works. Sufficient funds should be provided annually for this purpose in order that the community may realize a return in benefits from the investment made in the construction of the plant.

* * *

The New System of Morbidity Reports in Ohio.

Owing to certain unavoidable delays, the new system of morbidity reports did not go into full effect until the month of February, by which time practically every physician in the state had received a booklet of uniform blanks for reporting cases of notifiable diseases. The response on the part of physicians has been most gratifying. Reports of cases of venereal diseases, pneumonia, and mumps which have recently been added to the list of notifiable diseases show the prevalence of a proportionately large number of these diseases in the state. In this new system of collecting reports, chief reliance is placed upon the physician and there is evidence that the profession appreciates the responsibility placed upon it on account of the special knowledge possessed by its members. It may be stated as an axiom that the attitude of the medical profession toward any public health measure will determine its success or failure. The public has become accustomed to the spectacle of a profession whose chief end seems to be the restriction of its own field by public health activities of a varied nature. The limelight has been thrown upon the workings of the medical profession by the endeavors of many quack cults to secure legislative recognition. Nothing will stand the profession in better stead than its well known benevolent attitude toward the public health. If this attitude is changed, if physicians do not respect or live up to the responsibility laid on their shoulders on account of their special knowledge and skill, public opinion will not force legislatures to respect the opinion of the profession in regard to the licensing of quacks. It behooves the profession to do all in its power to aid public health work, and one of the best means of assistance is to see to it that none of its members is derelict in the duty of notifying the proper authorities of the occurrence of cases of reportable diseases. To realize that the profession is taking the same righteous stand on this question as on all previous questions of the same nature, it is only necessary to state that a number of letters received by the State Department of Health contain similar expressions of opinion shown in the following portion of a recent communication: "I am in receipt of notification blanks which you have issued from your department, which blanks are to be used in connection with the diseases noted on the back page. I think this a splendid thing and a mighty good move, and I hope that you will be able to enforce it. * * * Again I repeat that these blanks are very complete and certainly add very much to your efficient work. I will endeavor to see that it is closely followed here."

County medical societies should endeavor to educate all members to the realization of the full importance of reporting cases of notifiable diseases. On the other hand the State Department of Health will do everything in its power to aid physicians, to relieve busy practitioners and to solve such problems as may arise. Physicians are invited to correspond with the department in regard to any points in connection with the full operation of this new system. Any physician who has failed to receive a supply of blanks or who knows of a practitioner who has not received a supply will confer a favor by informing the department of this fact. A sufficient quantity of blanks have been secured to meet all needs, and physicians are urged to show no hesitancy in requesting adequate supplies for use in their practice.

IN MEMORIAM.

Dr. Josiah Hartzell.

Josiah Hartzell was born at Deerfield, Portage County, Ohio, September 7, 1833 and died in Canton, Ohio, November 11, 1914 at the age of 81 years.

The parents of Dr. Hartzell, Frederick and Mary Hartzell, were of German parentage but born and reared in Pennsylvania. His parents came to Ohio in 1810 and located in Mahoning County. The original American member of the Hartzell family, Heinrich Hartzell, came to Pennsylvania in 1687.

Dr. Hartzell passed his youth in Portage County, receiving his preliminary education in the common schools. Later he attended Amherst College, Massachusetts, and graduated from that institution in 1854 with the degree of Bachelor of Arts; subsequently he received the degree of Master of Arts and Doctor of Philosophy from his alma mater.

Dr. Hartzell studied law in Toledo and was admitted to the bar in 1856. After a brief residence in Davenport, Iowa, he came to Canton, Ohio, and in 1858 became editor of the *Canton Republican* and later was editor of the *Canton Repository,* continuing in this capacity for nearly twenty years. He resigned in order to give his attention to manufacturing interests with which he was identified. Dr. Hartzell represented these manufacturing interests at the Paris expositions of 1878 and 1900 at which times he made extensive tours of Europe.

Dr. Hartzell was long identified with the public service, local, state and national. In Canton he is remembered as the "father of the system of city parks" and also for his labors on the sewer commission. On May 1, 1893, Dr. Hartzell was appointed by Governor McKinley as a member of the State Board of Health and he was serving in this capacity at the time of his death. He had also served as a trustee of the Ohio Historical and Archaeological Society. He was for many years an active member of the American Public Health Association, and was a member of a special committee of that organization, appointed in 1898 to wait upon the President of the United States with a view to obtaining a bacteriological commission to go to Havana to study the cause and prevention of yellow fever. It is a matter of history that the commission appointed by President McKinley was instrumental in proving the cause of yellow fever and of establishing the methods for the prevention of this scourge as a result of which yellow fever was banished from Cuba. The studies of this commission have been of untold benefit to all countries where the disease formerly flourished.

Dr. Hartzell was for many years a contributor to newspapers, periodicals and to the proceedings of the various organizations of which he was a member. Especially interesting and instructive were his letters to his home paper describing his impressions of the many places he visited.

On February 21, 1856, Dr. Hartzell was married to Miss Mary K. Johnson. Of the eight children born to Doctor and Mrs. Hartzell, seven are living.

MINUTES OF THE FEBRUARY MEETING OF THE OHIO STATE BOARD OF HEALTH.

The regular monthly meeting of the State Board of Health was held in Columbus February 25, 1915. There were present Drs. Sutton, Grube, MacIvor, Brown, Hasencamp and Howell, and Mr. John G. Price representing the Attorney-General.

In response to a citation there appeared before the Board, Mr. J. H. Schindler, Manager of the Belle Vernon-Mapes Dairy Company, this company having been cited to show cause why equipment should not be installed to prevent the pollution of the water-course located near its milk depot at Novelty, Geauga County. The Board was informed that the company would do whatever was necessary to remove the source of complaint and the Board advised that an engineer be employed to study the situation and make recommendations as to the measures to be taken to prevent the continuance of the nuisance.

The mintes of the January meeting and the monthly and financial reports of the Secretary were approved.

Plans were approved for a proposed new public water supply for the village of Addyston, Hamilton County. Conditions are imposed prohibiting any connection being installed whereby unpurified water from the Ohio River may enter the distributing system, that proper reservoirs be provided and that the water should be satisfactory from a standpoint of quality.

The Board approved plans for a proposed new distributing reservoir for the public water supply of Coshocton.

Upon consideration of a request from the city of Akron for an extension of time for the construction of a sewage treatment plant for that city, the Board voted to defer taking action in the matter until its meeting in May, 1915.

Acting upon a request for reconsideration of a former action approving proposed extension of the storm sewer to the village of Brookville and adding as a condition that sanitary sewage must be kept out of the sewer, the Board voted to not rescind or modify its former action. The village is also advised that the misuse of existing storm sewers has resulted in the pollution of Wolf Creek and the creation of conditions objectionable to those who live in the vicinity of the sewer outlets. The council is urged to take prompt action to correct the misuse of the present storm sewers by passing and enforcing an ordinance making it a misdemeanor to discharge sewage or other putrescible wastes into these sewers.

Plans were approved for the improvement of the sewage treatment plant at Columbus with the conditions that the capacity for secondary treatment of the sewage shall be enlarged and additional devices for more complete treatment of the sewage shall be installed when deemed necessary by the State Board of Health and that the filtering material for the sludge drying beds must be submitted for approval before being placed in the filters. Contracts for the improvement are to be awarded prior to January 1, 1916.

Plans were approved for proposed additional sewerage and sewage treatment plant for the city of Coshocton. The city is required to provide competent superintendence for the sewage treatment plant and the keeping of records of operation. Contracts for the improvement are to be awarded prior to January 1, 1916.

The Board voted to approve detail plans for a proposed system of sanitary sewers for the village of Cuyahoga Falls. The village council is required to pass an ordinance regulating the proper use of the sanitary and storm water sewers and to provide for the issuance of permits for connections to the sewers. Contracts are to be awarded prior to August 1, 1916. The Board also approved plans for proposed sewer in Portage Street with the condition that all existing sanitary sewer connections within the district to be served by the Portage Street sewer and laterals shall be made tributary to the sewer system to be constructed in accordance with the plans previously mentioned.

Plans for a new sewage treatment plant for the city of Xenia were approved. This plant is to be constructed in order to comply with the order of the State Board of Health requiring purification of the sewage.

A request was presented from the village of Plymouth asking for reconsideration and further investigation of Quarry Lake as a source of water supply for the village. The Board voted to not reconsider its former action and to instruct the secretary to inform the village officials that the results of former investigations indicated that this quarry could not be made an acceptable source of water supply unless the water was purified. The village officials are advised to proceed immediately with the preparation of plans to secure a public water supply of sufficient quantity and of satisfactory quality and to submit such plans to the Board for approval at the earliest possible time.

Complaint by the city of Cleveland alleging the pollution of Burke Brook to the extent of being a public nuisance was received and referred to the Division of Sanitary Engineering for investigation and report.

Rules and regulations adopted by the health officer of the village of Columbus Grove were presented and received the approval of the Board.

Licenses to conduct maternity boarding houses and lying-in hospitals were issued to Evangeline Reams, 73 North Harris Avenue, Columbus, Anna L. Wright, 10518 Tacoma Avenue, Cleveland and Grace Wood, 1600 Harrisburg Road, Canton.

These institutions have been investigated and recommended for approval by the Board.

At the request of the Building Department of the city of Columbus, the Board voted to concur in authorizing the substitution of a lead bend for an iron bend to-wit: "That the waste of a bath tub, basin or sink in a residence, flat or apartment house be allowed to connect to a lead bend without reventing the closet, with no other fixture discharging above." The Ohio State Building Code provides that acting in conjunction the State Board of Health and the local building department may permit the use of a device, fixture or construction at variance with the provisions of the State Building Code.

Upon a recommendation of the Secretary, the following amendments were made to the rules and regulations governing morbidity reports:

Section 2. Each and every physician practicing in the State of Ohio who treats or examines any person suffering from or afflicted with, or suspected to be suffering from or afflicted with, any one of the notifiable diseases shall immediately report *in writing* such case of notifiable disease to the local health officer having jurisdiction. Said report shall give the following information:

1. The date when the report is made.
2. The name of the disease or suspected disease.
3. The name, age, sex, color, occupation, address, and school attended or place of employment of patient.
4. Number of adults and of children in the household.
5. Source or probable source on infection or the origin or probable origin of the disease.
6. Name and address of the reporting physician.

Provided, That if the disease is, or is suspected to be, smallpox the report shall, in addition, state whether the patient has ever been successfully vaccinated, and, if the patient has been successfully vaccinated, the number of times and dates or approximate dates of such vaccination; and if the disease is, or is suspected to be, cholera, diphtheria, plague, scarlet fever, smallpox, or yellow fever, the physician shall give immediate notice of the case to the local health authority in the most expeditious manner available; and if the disease is, or is suspected to be, typhoid fever, scarlet fever, diphtheria, or septic sore throat the report shall also state whether the patient has been, or any member of the household in which the patient resides, is engaged or employed in the handling of milk for sale or preliminary to sale: And provided further, That in the reports of cases of the venereal diseases the name and address of the patient need not be given.

Section 3. The requirements of the *next* preceding sections shall be applicable to physicians attending patients ill with any of the notifiable diseases in hospitals, asylums, or other institutions, public or private: Provided, That the superintendent or other person in charge of any such hospital, asylum, or other institution in which the sick are cared for may, with the written consent of the local health officer (or board of health) having jurisdiction, report in the place of the attending physician or physicians the cases of notifiable diseases and disabilities occurring in or admitted to said hospital, asylum, or other institution in the same manner as that prescribed for physicians.

Section 4. Teachers or other persons employed in, or in charge of, public, private and parochial schools, including Sunday schools, shall report immediately to the local health officer each and every known or suspected case of a notifiable disease in persons attending or employed in their respective schools.

Section 5. Local health officers or boards of health shall forward the reports by mail to the state department of health *at such times as are prescribed by said department* after first having transcribed the information given in a book or other form of record for the permanent files of the local health office. On each report thus forwarded the local health officer shall state whether the case to which the report pertains was visited or otherwise investigated by a representative of the local health office and whether measures were taken to prevent the spread of the disease or the occurrence of additional cases.

Section 6. Local health officers or boards of health shall, in addition to the provisions of Section 5, report to the state department of health in such manner and at such times as the State Board of Health may require by regulation the number of cases of each of the notifiable diseases reported to said local health officers or boards of health.

The next regular meeting of the Board will be held in Toledo March 24, 1915.

PUBLIC HEALTH ACTIVITIES IN OHIO.

Public Health Organizations.

The Public Health League of Delphos was organized on February 18th, with the following officers: president, Mr. Ira Cole; vice-president, Mrs. E. B. Mauk; secretary, Mrs. Calvin Miller; treasurer, Mr. I. F. Matteson.

On March 1st, the St. Marys Public Health League was organized with the following officers: president, O. E. Dunan; vice-president, Albert Herzing; secretary, Dr. W. A. Deerhake; treasurer, Thomas A. White. The city council has appropriated the sum of $400.00 to the Board of Health to apply toward a fund of $1200.00 per year to employ a permanent public health nurse. The Board of Education has appropriated $400.00 toward the fund and the remainder will be raised by the League. It is planned to employ a nurse in the fall.

To Furnish Lecturer Free of All Expense.

Pamphlets are being issued by the Anti-Tuberculosis League stating that a series of lectures has been arranged for, and any society, church, union or league can secure any of the lectures by notifying the league headquarters on Twelfth street. The league wants to cover as wide a territory as possible. Some of those who will lecture are Max Senior, John P. Frey, E. L. Hitchens, Dr. J. H. Landis, Dr. C. E. Allen, Dr. Wm. H. Peters, Dr. B. F. Lyle, Dr. A. E. Osmond, Charles Sampson, Rev. Mott Sawyers, Rev. Samuel Tyler, Judge B. S. Oppenheimer, Wm. H. Parker, Clarence Ballman, Frank Maltaner, Dr. R. G. Blume, Dr. Otto Geier, Dr. Jos. G. Wilson, Miss Ada Stokes, Miss Elizabeth Cocke, Dr. H. K. Dunham, Dr. C. A. L. Reed, Dr. Geo. Strohbach, Anthony Mees, Miss Sarah B. Helbert, Dr. H. E. Germann, Dr. John R. Meek.—*Cincinnati Enquirer.*

Public Health Nurses.

On February 18th, Miss Gertrude R. Steckel completed her month's work in Xenia for the Ohio Society for the Prevention of Tuberculosis, and was immediately employed permanently by the Xenia Social Service League.

Miss Alta C. Barnes has been employed by the Ohio Society to succeed Miss Steckel. She was sent to Bellevue where she will remain for one month. Miss Elizabeth Davison, traveling nurse for the Ohio Society, completed her month's work in St. Marys on March 2nd, and on March 8th began her work in Greenville.

Miss Elizabeth Fox, Superintendent of Nurses for the Dayton Visiting Nurse Association, and in ex-officio charge of all public health nursing done by the city department of health has resigned to accept a similar position in Washington, D. C. Her resignation takes effect April 1st.

Miss Fox has been in Dayton nearly two years, in which time she has been very successful in perfecting a competent nursing organization. Her loss to Dayton and to Ohio nursing interests will be a distinct one.

Miss Elizabeth Holt, who during the last year and a half has been identified with the Visiting Nurses' Association of Chicago, has been selected to assume the duties that have been performed by Miss Elizabeth Fox as superintendent of the Dayton Visiting Nurse Association. She will take up her new duties about the middle of April, when Miss Fox will leave to become head of the Visiting Nurses' Association at Washington City.

In order that she may become familiar with the work here and be ready to assume full charge when Miss Fox leaves, Miss Holt will come to Dayton some time during the latter part of March.

Tuberculosis Hospitals.

The Third Conference of Ohio Tuberculosis Hospital Superintendents will be held on Friday, March 26th, at the Franklin County Tuberculosis Hospital located two miles east of Columbus.

On March 1st, the County Commissioners of Butler County appropriated $5000 for a new building to be added to the present pavilion for the care of tuberculous patients. This is a county hospital located on the infirmary grounds.

On February 27th, Dr. Frank Anderson, chief physician at the Ohio State Sanatorium, resigned. He will be succeeded by Dr. J. D. Thomas of Catawba, Ohio.

Increase Capacity of Tuberculosis Hospital.

Deeming the capacity of the Springfield Lake Sanatorium recently opened by Stark, Portage, Columbiana, Mahoning and Summit counties, to be inadequate, the board of trustees, according to Henry Detmering, of Canton, the Stark county member of the board, has added six extra beds to each of the public wards in the institution, thereby increasing the capacity from 72 to 96.

There are 53 patients now in the hospital, Detmering said Friday. There are 12 applications for admission now on file. All of these being granted the former capacity of the sanatorium would have been filled.

"With accommodations for 96," said Detmering, "we will be able to attend to applications for some time yet. When the 96 places are taken we probably will be able to add a few more beds. The institution is new and we will not really know its capacity until the demands of necessity bring out all the available space."

Ohio State Sanatorium.

The Ohio Society for the Prevention of Tuberculosis has started a campaign to have increased facilities at the Mt. Vernon State tuberculosis sanatorium so that at least the more pressing demands upon the institution may be met. At the present time the institution, with a normal capacity of 145, is caring for 165, has had a waiting list since July, and is six weeks behind in its reception of applicants.

To remedy this situation an infirmary with beds for from 40 to 50 patients is needed, in addition to two additional open-air pavilions. These changes were endorsed last week at a conference of the heads of the various tuberculosis hospitals in Ohio, which was held at Mt. Vernon.

At the present time, the institution has no facilities for patients in an advanced stage of the disease. The institution was intended for patients suffering from incipient tuberculosis. For this reason the housing facilities consist chiefly of more or less open pavilions, permitting a maximum of fresh air. Patients frequently pass suddenly into more advanced stages of the disease and a more permanent hospital building is needed for their care. The State Board of Administration and the state budget commissioner have recognized this need and have recommended that the present General Assembly appropriate $50,000 for this purpose. The influence of the Ohio Society for the Prevention of Tuberculosis will be exerted to urge members of the legislature to grant this appropriation, and in addition, to provide the two extra pavilions which may be erected at small cost.

Christmas Seal Sale.

The preliminary report of the Christmas Seal sale as submitted by Mr. S. Livingston Mather, Cleveland, Chairman of the State Committee, shows the actual sale for 1914 to be $40,150.18, with three cities still to report, Hamilton, Massillon and Wapakoneta.

The preliminary report of the Public Health Nurse Contest indicates that the following cities have won the services of a nurse:

City.	*Population.*	*Receipts.*	*Per Capita.*
Greenville	6,403	$140 00	2.18
Delphos	5,155	80 00	1.55
Tiffin	12,097	145 52	1.20
Logan	5,157	56 88	1.10
Bellevue	5,456	56 91	1.04
St. Marys	5,816	60 00	1.03

The Clean-Up Spirit.

The civic committee of the Chamber of Commerce is setting a pace for the other. committees that will require real work for them to keep up with the procession. The civic committee is composed of six of the city's business and professional men who are taking the time from their own affairs to start an early clean-up movement.

It is a splendid beginning in the right direction, at the season of the year when a clean-up is most needed. The committee has secured the co-operation of the theater managers in removing from the court-house esplanade and the streets of the business section the board signs that have become conspicuous recently. This, however, it is understood, is only the first step in a campaign that is to be prosecuted with vigor toward the beautifying of the city.

Mayor Brockett and other city officials have signified their willingness to work in connection with the Chamber of Commerce along the lines indicated. This properly should lead to the work of removing refuse of every description from the alleys and back yards in the business section of the city. The committee will no doubt find this task rather a large one, but with the co-operation of the city officials small difficulty should be experienced in the accomplishment of the work.

While it is important that the city be cleaned up from the standpoint of appearance it is still more important that it be done for sanitary reasons.

The spirit manifested by the committee should result in a general awakening of all the citizens of Marion to the necessity of placing the city upon the highest basis possible from a health and sanitary standpoint. Like the measles, the clean-up spirit, when once it is started, will spread like wildfire and by the time the hot days of April and May arrive the city will be safeguarded against an epidemic of any kind. It is the duty of all public-spirited people to render every assistance possible to the Chamber of Commerce and city officials in their efforts to render the city of Marion a "spotless town" in reality. — *Marion Tribune.*

Compensation for Occupational Diseases.

Columbus, Ohio, February 18. — From the bench today the Ohio Supreme Court granted the motion of Attorney-General Edward C. Turner to require the Court of Appeals of Hamiton County to certify its record in the case of the Industrial Commission of Ohio vs. David Brown.

The Industrial Commission prosecutes error to secure a reversal of the decree by which it was held that Brown was entitled to compensation out of the state funds created under the workmen's compensation act.

He suffered from lead poisoning through what is termed an "occupational disease." The lower courts held that "occupational diseases" come within the scope of the compensation act, which is the question upon which the Supreme Court will be asked to pass.

Framers of the act four years ago, the predecessor of the compulsory act of 1913, did not intend that occupational diseases should be included, and demonstrated their purpose by defeating an amendment to include them.

INQUIRY WAS ORDERED.

At the same time the General Assembly authorized an inquiry preliminary to legislation on the subject of industrial health hazards. If the Supreme Court does not favor the very liberal construction of the Hamilton County Court, it is probable that the General Assembly will authorize a commission to frame a measure for the consideration of the Eighty-second General Assembly. The inclusion of occupational diseases would result in enormous increases in premium rates, it is held. — *Cincinnati Enquirer.*

Abolish the Coroner's Office.

"The office of the coroner is hereby abolished" is the first sentence in an act prepared for introduction in the Ohio Legislature. "An expensive futility" the Civic League of Cleveland calls the office.

The office ought to be abolished. It has been ripe for abolition for years. It has simply been a case of the legislature not getting around to the point of taking definite action. The coroner as a county official has continued to exist on sufferance.

By the terms of the present bill the duties of the coroner's office would be taken over by the prosecuting attorney's office. The prosecutor would be authorized to appoint a medical examiner, a "qualified practitioner of medicine and surgery," to take care of the medical part of the work.

According to the executive board of the Civic league, "efforts to combine in one office the ability to conduct a pathological examination and a criminal investigation is bound to meet with failure." It has met with failure probably every time it has been tried. New York is trying to abolish the coroner. It is time for Ohio to eliminate this useless relic.

No partisan considerations should be allowed to interfere with the legislative handling of this desirable reform measure. Members of both parties from all sections of the state may well agree to push it to enactment. — *Cleveland Plain Dealer.*

Costly Statistics.

It will always remain one of the profound mysteries why the vital statistics bureau was not handed over to the health board department and thus save $15,000 of the people's money and at the same time give the vital statistics some public value. As the case stands, after a long career of that bureau, the only visible results is a costly book of statistics for the literary department of the state house basement.

A bureau of statistics is not simply to gather figures, but to make use of them and to furnish lessons of life experience to the people. That has not been done. All the people know about a bureau of statistics is there is such a thing paying rent, located up in a skyscraper somewhere. The object was to transfer the bureau to the state board of health so as to make it directly contributory to one of the state's real demands, and to the official function that might utilize the figures. But this good purpose was defeated by some person or persons who cared less for the public welfare than their own. — *Ohio State Journal.*

Answering the Alarm.

If a city should have a fire department that merely recorded alarms instead of responding to them, it would soon be one with Nineveh and Tyre. A single experience with Mrs. O'Leary and her cow would suffice.

There are alarms in governmental departments other than fire. For instance, vital statistics are the alarms sent to our health departments, alarms that they are expected to answer. If the number of deaths from typhoid in a certain ward or district is greater than normal, an efficient health department will investigate and discover the exact location of the impure water supply. The presence of the more subtly contagious diseases evokes immediate preventive and curative action.

The system of '"answering the alarm" in matters of health is the one employed in our larger cities. But in the state at large the system is different. Vital statistics are reported to the secretary of state, in whose office they become insignificant records to be filed away in a manner that is positive neglect. The State Board of Health, the department that should respond to the alarms, does not have access to Ohio's vital statistics until months later, when they have become a rather grim form of history, and the damage has been lone.

A bill has been introduced in the General Assembly to transfer the report and compilation of vital statistics from the secretary of state's office to the State Department of Health. If it should pass, perhaps the conditions that permit more deaths from typhoid fever in townships than occur in the much larger city of Cincinnati, would disappear. — *Cincinnati Times-Star.*

Certain newspapers in the state are fond of printing articles ridiculing recommendations of local, state and national health authorities on sanitary matters. We do not pretend to be able to fathom such criticisms other than to say that they seem to be founded upon the thought that all of our modern ills would be removed by a return to the simple conditions of life of our grandfathers. The following reply to an editorial on the Good Old Common Drinking Cup, which appeared in one of the leading daily papers of the state speaks for itself:

Good Old Common Cup.

Let me say a word in support of your excellent editorial advocating the restoration of the good old, common drinking cup. Now that we can feel assured that the water which we are given to drink, while traveling, is pure, why should we longer permit the enforced usage of the individual cup to deprive us of rights and privileges enjoyed through so many years?

We again demand the right to drink from the same glass with the diphtheria carrier, and the man whose sputum is loaded with the germs of tuberculosis. Let us again restore the good old custom that allowed us to drink from the glass that had just been used by the man with a mouth full of rotten teeth. Why should we be denied the privilege of trailing along down the car, behind the man with a goodly quid in his cheek and the tobacco juice drooling from the corners of his mouth, in order that we might be ready to drink from the same glass while the yellow smears he left upon it were still fresh and tasty. Let us again enjoy the good old thrill that came when we drank after the man with a chancre on his lip, or mucous patches in his throat. The thrill that came, not because we knew we would contract syphilis, but because we never could be quite sure — the gambler's thrill that always comes from taking a chance.

By all means, now that the danger of typhoid has been eliminated from the water we drink, let us go back to the enjoyment of those things that were smeared so freely upon the good old "common vox populi drinking cup."

You and I, Mr. Editor, know what fools we mortals are apt to be. There are doubtless those who, because of a pandered and vitiated taste, are not able, like you and me, to appreciate thoroughly all the good things held within the common drinking cup. Would it not then be a kindly act to develop in them a cultivated taste by compelling them to drink of its contents? More power to you, Mr. Editor, in your fight for its restoration.

Legislation.

Bills of interest to the public health and social worker which have been introduced in the Eighty-first General Assembly of Ohio up to March 6th, are as follows:

SENATE.

S. B. No. 7 — Mr. Lloyd, Franklin Co., Jan. 18. Providing for the regulation and licensing of the loaning of money without security or upon personal property.

Jan. 19 — Judiciary com.

S. B. No. 9 — Mr. Carson, Muskingum Co., Jan. 18. Relative to changes of water supply for cities and villages.

Jan. 19—Pulic Health com.

Feb. 3 — Indefinitely postponed.

S. B. No. 16 — Mr. Archer, Noble Co., Jan. 18. Relative to obtaining marriage licenses.

Jan. 28 — Lost; yeas 13, nays 15.

S. B. No. 23 — Mr. Cass, Putnam Co., Jan. 19. Providing for the appointment of a juvenile and humane officer by common pleas or probate courts of county.

Jan. 20 — Judiciary com.

S. B. No. 29 — Mr. Stone, Lorain Co., Jan. 20. Relating to guardianship and control of inmates of children's homes.

Jan. 21 — Benevolent institutions com.

S. B. No. 54 — Mr. Mooney, Cuyahoga Co., Feb. 1. Providing that applicants for certificates as pharmacists shall have at least two years in approved schools.

Feb. 2 — Medical colleges com.

S. B. No. 55 — Mr. Kennedy, Cuyahoga Co., Feb. 1. Appropriating $5,000 for extension of state free employment agencies.

Feb. 2 — Finance com. Feb. 4 — Recommended.

S. B. No. 8 — Mr. Mooney Cuyahoga Co., Feb. 2. Legalizing practice of Christian Science.

Feb. 3 — Public Health com.

S. B. No. 60 — Mr. Bauer, Hamilton Co., Feb. 2. Defining delinquent and dependent child.

Feb. 3 — Benevolent institutions com. March 4. Recommended amended.

S. B. No. 64 — Mr. Behne, Williams Co., Feb. 3. To give State Board of Health supervision of public vaults and mausoleums.

Feb. 4 — Public Health com.

S. B. No. 71 — Mr. Archer, Noble Co., Feb. 8. Providing for the registration of bottles, siphons, siphon tops, fountain tanks, kegs, or other containers; and making it unlawful for any person, other than the owner thereof, to fill, refill, deal or traffic in such bottles and other containers.

Feb. 18 — Passed; yeas 23, nays 2.

Feb. 24 — House Public Health com.

March 4 — Recommended.

S. B. No. 73 — Mr. Mooney, Cuyahoga Co., Feb. 8. Relating to the board of state charities, the juvenile court and county children's homes.

Feb. 9 — Benevolent institutions com.

S. B. No. 75 — Mr. Wickline, Summit Co., Feb. 8. To provide for the further regulation of embalming and the preparation and disposal of the dead.

Feb. 9 — Public Health com.

S. B. No. 84 — Mr. Lloyd, Franklin Co., Feb. 9. Relating to the practice of dentistry.

Feb. 10 — Public Health com.; Feb. 25, recommended amended; March 2, amended; March 2, passed; yeas 29, nays 0. March 4, House Public Health com.

S. B. No. 103 — Mr. Vorhies, Guernsey Co., Feb. 12. Requiring physicians to report prevalence of certain diseases to State Board of Health.

Feb. 15 — Public Health com.

S. B. No. 131 — Mr. Lloyd, Franklin Co., Feb. 24. Relating to the registration of pharmacists.

Feb. 25 — Public Health com.

HOUSE.

H. B. No. 14 — Mr. Young, Cuyahoga Co., Jan. 19. Relative to the employment of females and regulating their hours of employment.

Jan. 20 — Labor com.

H. B. No. 17 — Mr. Bohm, Cuyahoga Co., Jan. 19. Giving one rest day a week to employes in certain trades.

Jan. 20 — Labor com.

H. B. No. 61 — Mr. Deaton, Miami Co., Jan. 19. Permitting probate court to issue marriage license to persons under legal age who have no guardian.

Jan. 20 — Codes, Courts and procedure com. Feb. 1, recommended amended. Feb. 3, amended. Feb. 3, passed; yeas 96, nays 5.

Feb. 8 — Senate Judiciary com. Feb. 24, without recommendation. Feb. 25, passed; yeas 17, nays 7. Approved by Governor.

H. B. No. 64 — Mr. Deaton, Miami Co., Jan. 19. To place bureau of vital statistics under State Board of Health.

Jan. 20 — Public Health com. Feb. 11, recommended amended. Feb. 18, lost; nays 79, yeas 24.

H. B. No. 94 — Mr. Walsh, Cuyahoga Co., Jan. 19. To provide for admission of feeble-minded youths to state institutions.

Jan. 27 — Passed; yeas 107, nays 0. Feb. 1, Senate Benevolent Institutions com. Feb. 2, recommended. Feb. 4, passed Senate; yeas 26, nays 0.

H. B. No. 98 — Mr. Young, Cuyahoga Co., Jan. 20. To indemnify persons unjustly imprisoned by the state.

Jan. 21 — Benevolent and Penal Institutions com.

H. B. No. 103 — Mr. Garver, Holmes Co., Jan. 20. Providing payment of fees in prosecutions for bastardy.

Jan. 21 — Judiciary com.

H. B. No. 104 — Mr. Cromley, Knox Co., Jan. 20. To repeal indeterminate sentence law.

Jan. 21 — Codes, Courts and Procedure com. Feb. 3, reported without recommendation. Feb. 9, lost; yeas 40, nays 65. Feb. 18, reconsidered and passed; yeas 71, nays 41. Feb. 19, Senate Judiciary com.

H. B. No. 121 — Mr. Hoy, Jackson Co., Jan. 21. Authorizing the State Board of Health to produce free diphtheria antitoxin.

Jan. 25 — Public Health com. Jan. 28, recommended amended. Feb. 2, passed; yeas 106, nays 1. Feb. 3, Senate Public Health com. Feb. 11, recommended. Feb. 18, passed; yeas 27, nays 0.

H. B. No. 132 — Mr. Platt, Ashtabula Co., Jan. 25. To transfer from agricultural commission to State Board of Pharmacy the power of enforcing regulation of sale of drugs.

Jan. 26 — Agricultural com.

H. B. No. 135 — Mr. Morris, Fairfield Co., Jan. 25. Exempting school buildings of one room from provisions of law on fire exits.

Jan. 26 — Common Schools com. Feb. 12, recommended. Feb. 25, recommitted to Public Building and Land com.

H. B. No. 138 — Mr. Jones, Franklin Co., Jan. 25. To provide for prosecution of suit over possession of a child.

Jan. 26 — Judiciary com. Feb. 10, recommended amended. Feb. 17, lost; yeas 50, nays 53.

H. B. No. 140 — Mr. Jones, Franklin Co., Jan. 25. To provide for adoption of minor child by an unmarried person or husband and wife.

Jan. 26 — Codes, Courts and Procedure com.

H. B. No. 142 — Mr. Hoy, Jackson Co., Jan. 25. To bar undesirables from the practice of medicine.

Jan. 26 — Public Health com. Feb. 11, recommended. Feb. 19, passed; yeas 71, nays 13. Feb. 24, Senate Judiciary com. March 13, recommended.

H. B. No. 150 — Mr. Black, Wyandot Co., Jan. 25. Transferring control of the woman's reformatory at Marysville from the building commission to the State Board of Administration.

Jan. 26 — Benevolent and Penal Institutions com. Feb. 12, recommended amended. Feb. 24, passed; yeas 95, nays 0. Feb. 26, Senate Benevolent Institutions com.

H. B. No . 154 — Mr. Morris, Fairfield Co., Jan. 26. Providing new conditions for entrance to Mt. Vernon Tuberculous Sanatorium.

Jan. 28 — Public Health com. Feb. 19, recommended amended. Feb. 25, passed; yeas 91, nays 0. March 1, Senate Judiciary com.

H. B. No. 156 — Mr. Ott, Hamilton Co., Jan. 26. Providing that street car men shall have 13 hours rest out of every 24 hours.

Jan. 28 — Labor com. March 4, recommended amended.

H. B. No. 175 — Mr. Bohm, Cuyahoga Co., Feb. 1. Empowering State Industrial Commission to license all private employment agencies and regulate their activities.

Feb. 3 — Labor com.

H. B. No. 177 — Mr. Terrell, Cuyahoga Co., Feb. 1. To permit Christian Science healers to practice and collect fees.

Feb. 3 — Codes, Courts and Procedure com.

H. B. No. 190 — Mr. King, Hocking Co., Feb. 1. To legalize agreements between employer and employe and limit injunctions.

Feb. 3 — Labor com.

H. B. No. 203 — Mr. Chapman, Montgomery Co., Feb. 1. Providing county commissioners may maintain comfort stations on county property.

Feb. 3 — County Affairs com.

H. B. No. 218 — Mr. Whittacre, Columbiana Co., Feb. 1. Appropriates $5,000 for extending system of free employment agencies.

Feb. 1 — Appropriations com. Feb. 3, recommended. Feb. 9, passed; yeas 101, nays 0. Feb. 17, passed Senate; yeas 24, nays 0.

H. B. No. 220 — Mr. Platt, Ashtabula Co., Feb. 3. To authorize and regulate the practice of chiropractic.

H. B. No. 227 — Mr. Hunter, Franklin Co., Feb. 3. To provide for a survey, examination and report upon waterways of the state by special board.

Feb. 8 — Public Works com.

H. B. No. 231 — Mr. Powell, Gallia Co., Feb. 3. Prohibiting the contamination of streams and other water courses and bodies of water by the discharge of wastes from manufacturing, rectifying or other plants.

Feb. 8 — Public Health com.

H. B. No. 244 — Mr. Nieding, Lorain Co., Feb. 3. To create the department of public health and medical registration.

Feb. 8 — Public Health com.

H. B. No. 249 — Mr. Cowan, Putnam Co., Feb. 3. Relating to the admission of persons to state institutions.

Feb. 25 — Passed; yeas 94, nays 0. March 1 — Senate Prisons com.

H. B. No. 250 — Mr. Oberlin, Stark Co., Feb. 3. Providing for the commitment of inebriates, dipsomaniacs or persons addicted to the habitual use of drugs to hospitals for the insane.

Feb. 8 — Public health com. March 4 — Recommended amended.

H. B. No. 269 — Mr. Fox, Lucas Co., Feb. 8. To provide for the extension of sewer districts outside of municipalities.

Feb. 10 — County affairs com.

H. B. No. 270 — Mr. Hoy, Jackson Co., Feb. 10. Relating to custody of minor children.

Feb. 11 — Codes, courts and procedure com.

H. B. No. 277 — Mr. Hyle, Cuyahoga Co., Feb. 11. Relative to Ohio State building code.

Feb. 15 — Public buildings and lands com.

H. B. No. 279 — Mr. Hyle, Cuyahoga Co., Feb. 11 — To provide for the support of persons who have become permanently incapacitated for work by reason of physical or mental infirmity or by reason of having attained an age in excess of 65 years.

Feb. 15 — Codes, courts and procedure com.

H. B. No. 280 — Mr. Fitzsimmons, Cuyahoga Co., Feb. 11 — To provide for the proper cleaning of all railroad or railway passenger cars or coaches operated within the State of Ohio.

Feb. 15 — Public health com. Mar. 4 — Indefinitely postponed.

H. B. No. 292 — Mr. Jones, Franklin Co., Feb. 1. To prevent minors from becoming vagrants.

Feb. 15 — Judiciary com.

H. B. No. 301 — Mr. Beitler, Hancock Co., Feb. 15. Relating to the labeling and care of poisonous substances.

Feb. 16 — Public health com.

H. B. No. 302 — Mr. Palmer, Henry Co., Feb. 15. To prohibit the sale of soda water, soft drinks or other beverages to which has been added morphine, caffeine, cocaine or strychnine.

Feb. 16 — Public health com.

H. B. No. 305 — Mr. Hoy, Jackson Co., Feb. 15 — To regulate the sale, distribution, giving away of opium, and to regulate the treatment and to provide for the committal of the habitual users of such drugs.

Feb. 16 — Public health com.

H. B. No. 311 — Mr. Cowan, Putnam Co., Feb. 15 — To prevent the procreation of defectives and to provide for operation for the prevention of procreation.

Feb. 16 — Public health com.

H. B. No. 318 — Mr. Hulswitt, Hamilton Co., Feb. 16. Relating to lunatics, idiots and imbeciles.

Feb. 17 — Codes, courts and procedure com.

Mar. 4 — Recommended amended.

H. B. No. 321 — Mr. Beetham, Harrison Co., Feb. 16. Making it unlawful for any person to falsely represent himself or herself as blind, deaf, dumb, crippled.

Feb. 17 — Judiciary com. Mar. 4 — Recommended.

H. B. No. 323 — Mr. Sprague, Scioto Co., Feb. 16. To regulate the practice of nursing.

Feb. 17 — Universities and colleges com.

H. B. No. 351 — Mr. White, Columbiana Co., Feb. 26. Placing control of maternity hospitals and boarding houses for infants under board of state charities.

Mar. 1 — Benevolent and penal institutions com.

H. B. No. 360 — Mr. Hoy, Jackson Co., Feb. 26. Providing additional allowance for surgical attendance in industrial accidents.

Mar. 1 — Public health com.

H. B. No. 376 — Mr. White, Columbiana Co., Mar. 1. To provide for the control of the educational requirements and registration of pharmacists.

Mar. 4 — Universities, colleges and normal schools com.

H. B. No. 380 — Mr. Young, Cuyahoga Co., Mar. 1. To enjoin and abate houses of prostitution.

Mar. 4 — Public health com.

H. B. No. 384 — Mr. Ott, Hamilton Co., Mar. 1. Relating to the inspection of plumbing.

Mar. 4 — Public health com.

H. B. No. 390 — Mr. Hoy, Jackson Co., Mar. 1. To regulate the sale or the disposition, in any manner, of opium or coca leaves.

Mar. 1 — Public health com.

H. B. No. 392 — Mr. Cromley, Knox Co., Mar. 1. Relating to the definition of "imbecile".

Mar. 4 — Codes, courts and procedure com.

H. B. No. 393 — Mr. Nieding, Lorain Co., Mar. 1. To legalize the sale of drugs in stores other than drug stores.

Mar. 4 — Public health com.

H. B. No. 395 — Mr. Snider, Pickaway Co., Mar. 1. Relating to the control of municipal hospitals.

Mar. 4 — Judiciary com.

H. B. No. 397 — Mr. Knox, Washington Co., Mar. 1. To provide for the examination and admission to practice of naturopathic physicians.

Mar. 4 — Public health com.

H. B. No. 425 — Mr. Beitler, Hancock Co., Mar. 4. Relative to admission of non-residents to state benevolent institutions.

H. B. No. 433 — Mr. Shank, Medina Co., Mar. 4. Relating to the admission of children to children's homes.

H. B. No. 435 — Mr. Haines, Tuscarawas Co., Mar. 4. To regulate and control the delivery to hospitals of persons seriously sick or injured.

The following bill has been enacted into law:

H. B. No. 121, MR. HOY, JAN. 21st.

To authorize the State Board of Health to produce antitoxin for distribution for the cure and prevention of diphtheria.

Be it enacted by the General Assembly of the State of Ohio:

SECTION 1. The state board of health shall make necessary arrangements for the production and distribution of diphtheria antitoxin, provided that such antitoxin shall in all respects be equal in purity and potency to the standard of requirements of the United States Public Health Service for antitoxin for interstate commerce. Diphtheria antitoxin shall be distributed in accordance with such rules and regulations as may be adopted by the State Board of Health.

SECTION 2. Any licensed physician practicing in the State of Ohio, or the superintendent of any state or county institution shall be entitled to receive without charge such quantities of antitoxin as he may require for the treatment or prevention of diphtheria in poor or indigent persons, provided that such antitoxin shall be used only for persons residing in the State of Ohio, and that a sufficient supply is available for distribution.

SECTION 3. Any person or persons who shall sell any diphtheria antitoxin produced and distributed by the State Board of Health shall be guilty of a misdemeanor and upon conviction shall be fined in any amount not exceeding one hundred dollars.

Jan. 25th.	Public Health Committee.
Jan. 28th.	Recommended amended.
Feb. 2nd.	Passed, yeas 106, nays 1.
Feb. 3rd.	Senate Public Health Committee.
Feb. 11th.	Recommended.
Feb. 18th.	Passed Senate; yeas 27, nays 0.
Mar. 6th.	Approved by Governor.

The Tendency of National Health Work.*

The new spirit which is to rule public health work during the coming year is the spirit of active coöperation. This is not a mere theoretical matter to be talked of vaguely and taken for granted, however; it is something which we are now going to strive for with greater efforts than ever before.

The American Public Health Association, which has for forty-two years fostered better coöperation among the health workers took an aggressive stand on this point at its recent meeting in Jacksonville, Fla. There the Association's President, William C. Woodward, delivered an address which aroused unprecedented enthusiasm for the new possibilities in public health organization. In a plain and simple manner he marked out for us the tendency of the day in public health work, and the policy to be followed henceforth in the conduct of public health organizations.

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*A communication to all those interested in public health work in Ohio from Prof. S. M. Gunn, Secretary of the American Public Health Association, Boston, Mass.

His "Plea for Efficiency" involved first, conservation of money and volunteer service devoted to public health work. Second, better organization, supervision and control of the working forces of public health associations. Third, the rendering of better service to the public.

President Woodward has summarized his appeal as follows: "That coördination of the work of our public health agencies would be productive of better results than are now attained seems certain. There would be less overlapping of effort and of appeals for funds, and each organization would profit by the experience of all others. But there would still be the same multiplicity of officers and employes, engaged in the same kinds of administrative work; possibly the same number of more or less expensive offices; the same division of resources; and the same weakening of strength and authority in the appeals to the public for support and for action. Only as a step toward consolidation does any effort to coördinate the work of special organizations seem worth while unless there is some inseparable obstacle in the way of consolidation. Whether there is any such obstacle must appear when we consider, as we shall now proceed to do, the advantages and disadvantages of a single organization as compared with those incident to the present multiplicity of agencies, each operating in a field of special endeavor."

For a state which has as high a per cent of active, intelligent health officials in its towns and cities as Ohio has, we feel sure there will be an immediate recognition of the benefit to be derived from supporting an organization which is avowedly determined to devote its chief attention this coming year toward conservation of those resources and concentration of those efforts intended to help the health official in his work both directly and indirectly. In consideration of these facts your state is not doing itself justice in its representation in the American Public Health Association. There are only fifty-four members in Ohio.

The past achievements of the Association taken alone are sufficient to justify an appeal to Ohio for a larger representation. The Association's section for Public Health Officials has done admirable work in the promotion of uniformity and scientific progress in the work of health officials. Its section on Vital Statistics has done much to promote effective systems of registering vital statistics and aiding in the adoption of uniform methods of statistical practice. Its Laboratory Section has undertaken the preparation of standard methods of both chemical and bacteriological analyses. Its Sanitary Engineering Section has promoted closer coöperation between the medical and engineering professions on the many questions relating to public health which have an engineering aspect. Its Sociological Section has made progress in solving the problem of closer relationship between social workers and health officials. At the last meeting another section was organized for the promotion of industrial hygiene.

Now the Association is entering on the broader mission of interesting the whole country in an effort to secure public health more efficiently, more thoroughly, and more uniformly than ever before. One excellent characteristic of the American Public Health Association is its recent evolution from a closed professional organization into a big public organization which opens its membership to everyone actively engaged in the improvement of public health conditions or seriously interested in this work. Through its monthly publication "The American Journal of Public Health," this Association offers a service which is indispensable to any public health worker. If health officials all over Ohio will give these facts a moment's consideration, many of those who are not now members of the American Public Health Association will write the secretary for information about membership in the Association and for information about attending the 1915 meeting of the Association in Rochester, N. Y., September 7 to 10.

CURRENT COMMENT ON MATTERS OF PUBLIC HEALTH AND SANITATION.

County Health Organization in the United States.

In June, 1914, the statistician of the Metropolitan Life Insurance Company read a paper on "County Health Organizations" before a section of the American Medical Association. The object of the paper was to show the necessity for proper health organization in rural districts as well as in cities.

Tables and charts were given which show that from 1900 to 1912 the death rate fell 15.1% in those states which recorded vital statistics. In the cities the decline was more pronounced than in the rural districts, being 21.2% in the cities and 8.6% in the rural districts. According to the census of 1910, 53.7% of the people of the United States were located in centres of less than 2,500 population. This means that in spite of the rapid growth of cities America is still largely rural in character. Thus in order to reach the greatest number of people, our energies along the line of preventive medicine should be directed toward the rural districts. No doubt, by better organization of health supervision, results similar to those obtained in the larger cites may be secured and the mortality rate much reduced.

"The key to the solution of the problem of rural hygiene lies in the development of efficient county health organizations in the United States." The county is usually the chief unit of local government and at the present time there are 2,953 counties in the United States. The county usually contains about 600 square miles and has a population of about 20,000. Five-sixths of these counties are rural in character, and about half of them have no towns with more than 2,500 people. While the American county is usually supreme in judicial affairs it does not realize that it owes its people suitable health supervision.

"The county health officer should be the most important single factor in conserving American public health," and yet in many states no such office exists and its duties are left to township or village officials without supervision.

In order to obtain exact knowledge regarding county organization the Metropolitan Life Insurance Company sent a list of questions to be answered by the executive officer of the health department of all the states. From the replies received it is evident the question of county organization is a point of great concern among the chief health authorities. Out of the forty-one states that answered, thirty-one have county health officials but only five had arranged for full-time health officers in any of their counties. In the other states, if they had a county health officer, he devoted only a part of his time to health work. These officials were paid various wages and in many cases their salary was only $100.00 per annum. In many states no special training is required and the county health officer is responsible only to local authorities. Quite often there is no provision for laboratory work and the health officer is subject to political machinery. In the replies received the demand for full-time health officers was almost unanimous and it is quite evident that they are necessary, should be properly paid and should be subject to state supervision instead of being subject to county politics. One reply from a western state says: "The present system is not efficient and never can be."

No system will be equally applicable to all states, for a plan that is necessary in New York may be too expensive for a large and sparsely populated state. Local conditions, both geographical and economic, must be taken into consideration. The following are a few rules which will apply to all states and are considered essential:

1. The county health organization must be an integral part of the state health administration and be responsible to it. The county officials should receive orders from the state department and be liable to removal by it for cause.

2. The county health officer must be a full-time official whose sole interest is in serving the public without any private interests or enterprises which might hinder him in performing his duties.

3. The county health officer should be trained in the science of sanitation and public health. Several larger medical schools have organized post graduate courses in public health.

4. The tenure of office of the health officer should be coextensive with his efficient service. After proper qualifications each year makes him more capable and he should not be removed as long as his work is efficient. A period of six to eight years has been suggested at the end of which time a satisfactory officer should be reappointed, although he should be subject to removal by the state for incompetence or negligence.

In order to secure suitable men it is necessary to give them a reasonable compensation for their services. High standards and full time are required and the compensation should be sufficient to enable a man to live comfortably without another source of income.

Statistics show that a great amount of good can be accomplished by full-time county health officers and the state adopting such an organization will reap great rewards. In some states the death rate from tuberculosis is very high, especially in certain districts and it is needless to say that in such districts the health official would find a great field.

In 1911 the typhoid death rate was 22.2 per hundred thousand in rural sections and only 18.6 in cities, which shows that the rural districts need better sanitation and supervision. The health officer who would improve sanitation and reduce the number of cases and deaths from typhoid alone would be worth many times his cost to the state. But the county health officer would not confine himself to tuberculosis and typhoid but would be able to reduce the sickness and death from all of the communicable diseases, together with bringing about supervision of child labor and school inspection.

His influence in the community and his supervision of physicans would also bring about better reports of diseases and deaths and as a result the whole system of vital statistics would be improved.—*Abst. J. A. M. A.*, 1915.

An Experiment in Health Administration.

Under the direction of the Health Commissioner of New York an area on the east side of the city, bounded by Scammel, Division and Clinton Streets, and the East River, has been marked off as a "health district," in which will be tested the value of a method of local health administration. This consists in the proposed government of the district, for health purposes, from within the district itself with the co-operation of a local volunteer health board, instead of from department headquarters, and in the control of field workers by a local director in the place of various bureau chiefs. This plan aims at the avoidance of overlapping by different bureaus or departments concerned with health matters, and at increased usefulness through the establishment of intimate neighborly relations between the department of health and the local community. The development of the plan is under the control of Dr. Shipley.—*Abst. Medical Record.*

Public Health Surveys.

The purpose of a public health survey is to furnish data necessary and essential for constructive development of a health department of a city together with the elimination of hazardous conditions under the control of other city departments. Co-operation of the various city departments together with the state department of health makes possible the elimination of preventable diseases and a reduction in the death rate. Consideration of the birth and death rates together with the morbidity reports of the place under investigation often brings to light the field in which reform is necessary. An investigation of sanitary conditions such as water supplies, sewage disposal, milk and food supplies, wells, privies, etc., often reveals the agency by which many infectious diseases are disseminated. The reports of tuberculosis and venereal diseases and a survey of social conditions will also show instances in which proper supervision and reform will be advantageous. The efficiency of the local department of health and its records, organization, methods of inspection and administrative ability give evidence of the need of better supervision.

The cost of a health survey is very small when compared with results achieved, for as a result of such a survey the various departments are stimulated to more efficient work, insanitary conditions are improved or entirely eliminated, many cases of sickness are avoided, and the number of deaths from preventable diseases reduced. Quite often the correction of the insanitary conditions which are endangering public health and welfare, necessitates large appropriations for the health department, but these funds are really returnable for the corresponding decrease in the number of sick, widows, invalids and orphans reduces the appropriation necessary for their maintenance.

The medical profession should be the first to recognize the value of such a survey and take the initiative in civic problems relating to public health. If the medical organizations do not inaugurate such campaigns it may be taken up by the chamber of commerce or some social organization, for a scientific survey is essential for the best development of public health and social welfare. — Abst. *Medical Review of Reviews,* 1915.

The Campaign of Education.

At the recent meeting of the American Public Health Association in Jacksonville, a discussion took place as to whether or not cancer is greatly on the increase. Mr. Hoffman of the Prudential Insurance Company believes that it is, while Professor Willcox, of Cornell University, thinks that the increase of the death rate from cancer is not a real increase but only an apparent one. The statistical evidence is too imperfect as yet to warrant the drawing of any definite conclusions. American statistics are notoriously incomplete and even in the registration districts we have little guarantee of their accuracy. In other countries where more or less accurate statistics are available, students of this subject do not find an enormous increase in cancer; they admit some increase, but not much more than could be explained by the fact that more people now live to reach cancer age.

It is right and proper that the general public should be warned of danger when it exists, and should be instructed to detect the peril in its incipiency, but this does not mean that we should make a hypochondriac of every man and woman over thirty-five. The campaign of education, to be effective and of the greatest good to the greatest number, should be along the line of rational argument as to the fitness of consulting the physician when anything seems to be wrong. It is the physician and not the layman who should first be instructed. "The campaign of education must be directed toward the prevention of cancer by the maintenace of the general health, as well as toward the eradication of the various factors, within and without the body, which are thought to exercise a predisposing influence in the initiation of malignant disease." — Abst. *Medical Record,* 1915.

Health Instruction In An Indiana County.

Common sense is an uncommon quality. Those who in their early youth read and enjoyed the William Henry Letters, will recall that this was a refreshing characteristic of that young hero. When sent away to a boarding school, he was told that he would have to take dancing lessons in order to learn how to enter a room. He could not see the need of taking lessons for this purpose. He said, "Just walk right in." One of the most difficult lessons to learn is that the way to do a thing is to do it. The county health commissioner of Union County, Indiana, feels that one of his duties is to teach the people of the county how to keep well. He has accordingly prepared a little seventy-five page pamphlet, made up largely of material published by the various state boards of health. The board of county commissioners made an appropriation to send a complimentary copy to every home in the county. The pamphlet is simply but forcibly written, and contains chapters on the home, contagious diseases and the baby. In the first chapter, the people are told how to keep their homes clean and healthful, how to dispose of their garbage, how to care for their food and how to take care of their bodies. Directions for disinfection and especially directions for various contagious diseases make up the second chapter, while the third and most important contains directions to mothers for the care of themselves and their children. We have been a long time in learning that if the teacher of good health would compete with the patent medicine man, he must meet him on his own ground. Instruction of the people on health topics is a public duty. It should not be left to professional zeal or to philanthropy. The publication and distribution of such pamphlets as the Union County Health Book are directly and solely for the public good and will yield large dividends in the form of better health and prosperity for the people. If each county in the nation had a health officer as wide awake and a board of commissioners as broad minded as those of Union County, Indiana, says *The Journal of the American Medical Association,* the problems of the prevention of disease and the prolongation of life would be immensely simplified.

Social Insurance and the Medical Profession.*

Unfortunately, the practice of medicine is so exacting that the busy practitioner finds but little time to devote to the study of social problems. In the initial stages of the development of social insurance the medical profession did not play any significant part. The purpose of social insurance is no less than abolition of destitution in modern society, not at some distant future, but under the very conditions in which we live at present. It is but a large part of the broad world movement for conservation of human health and happiness for which the medical profession has done so much in the past and will do so much in the future.

Physicians need not be told what the usual causes of human destitution are. They meet them in their everyday experience. The savings of the vast majority of families are so small that the first case of lingering illness or unemployment may bring even a seemingly prosperous family to the verge of destitution. The pressure of the high cost of living and the natural, inevitable desire for a higher standard have destroyed any substantial margin between the workman's income and outgo.

NATURE OF SOCIAL INSURANCE.

Social insurance as it has developed throughout the civilized world within the last three decades is an organized movement to prevent the destruction of wage-working families as consuming units by any of the ordinary emergencies of modern day existence. It recognizes that through the method of insurance, or the method of distribution of individual losses through larger numbers of individuals the effect of such accidental occurrences may be very largely alleviated.

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* Abst. from "The Journal of the American Medical Association" for Jan. 30, 1915.

Social insurance does not differ from the general scientific principles of insurance as a whole except in recognizing that this ceases to be a matter of individual concern and becomes the concern of organized society or the state. I take it that the burning of a private mansion does not represent a serious social problem beyond the individual suffering that its owners might be subjected to. But whether the millions of wage-earners in this country are or are not to be insured against consequences of industrial accidents or occupational disease is a matter of the gravest importance to society at large.

Millions of wage-earners are unwilling or unable to bear the burden of insurance, so that it means the establishment of national or public institutions to help and encourage the various forms of insurance which the workman needs for protection against the various hazards of his existence. The social organization may be obliged to compel and enforce insurance even against the desires of the individual, so that he and his family may be protected against his own poor judgment. Not only the wage-workers themselves but also the employers and the public at large share in the cost of curing and alleviating illness.

WORKMEN'S COMPENSATION.

One large branch of social insurance has left the domain of theory. The accident compensation movement affects the medical profession in many ways, and forces it to face many problems. The relation between compensation and the physician may be studied from two points of view, first as to what workmen's compensation has done or will do for the medical profession, and second as to what the medical profession can and will do for workmen's compensation.

ECONOMIC POINT OF VIEW.

Compensation has created a large additional demand for the services of the physician and surgeon, for before its advent comparatively few workmen could afford to command all the necessary medical aid. Accident meant the loss of wages, and the workmen were forced to go to free hospitals and dispensaries, to take questionable home remedies, or to get into debt by going to their family physicians. With the recognition of the employer's duty to furnish medical aid, all this has changed. Moreover, not only has the amount of work increased, and the amount of gratuitous work and uncollectable bills decreased, but the rate of remuneration has also materially improved. Medical aid is not a luxury, but a prime necessity — all must have it, and all cannot afford to pay the same or even a fair price for it. A higher charge can be made for it when employers, or industry, or, in the last analysis, the entire community, has been charged with the burden. This is what compensation has done for the physician; but he must not make the mistake of trying "to make a good thing out of it." I plead for the rule of reason in medical bills, because in the final analysis the interests of the toiling masses demand it. A fee schedule agreed on after proper consultation with physicians is absolutely necessary, and should receive the cordial support of the profession.

A certain stimulus to malingery and fraud lurks hidden in the provisions of the compensation act. It is wrong to exaggerate it, but it is equally wrong to disregard it. The responsibility often falls on some member of the medical profession whose crime is that of collusion and fraud, or of ignorance as to the moral duties of the physician to his patient.

An indirect result of compensation is the stimulus it must give to the work of prevention. For many years our engineers were too busy constructing gigantic buildings and intricate machinery to pay much attention to reducing the toll in human life and limb. As yet the medical profession has paid slight attention to industrial diseases, and much of the work of investigating has been done by non-medical men.

In 1912, the American Association for Labor Legislation, encouraged by the progress made with accident compensation, provided for a special national committee on social insurance. During the greater part of two years this committee of leading authorities on the subject has been working on a plan for compulsory health insurance in America. The work has progressed to the point where it may be confidently expected that a bill will be introduced in some of the state legislatures in 1915.

SOCIAL POINT OF VIEW.

No one knows better than the physician what an important factor poverty represents both in causing disease and in preventing its proper treatment and cure, for he cannot fail to feel the entire hopelessness of medication and advice unless supported by substantial improvement in the general hygienic conditions and economic well-being of the family. One might as well try Christian Science or absent treatment as to advise good nourishment, fresh air or rest, where the illness of the wage-worker also means the complete stoppage of income. Sickness causes poverty through the interruption of income, and the cost of medical treatment. Poverty causes sickness through lack of good food, good lodgings, through ignorance and neglect of personal hygiene, through destruction of mental rest. It is only with the help of sufficient medical aid and the necessary economic assistance that this vicious circle can be broken.

The socialization of medical service has been [illegible] delayed, as compared with many other functions of far lesser importance, but at last it is on its way. The purpose it must accomplish is two-fold — improvement in quality and cheapening of cost. These purposes cannot be easily accomplished in face of an obstinate opposition from the medical profession.

PROBLEMS.

The technical problems arising in connection with the relation between a sickness insurance and the medical profession are many and complex. Whether the millions of individuals protected by the sickness insurance system be granted the right of selecting their physician, or whether the physician be selected by some one else; whether the remuneration of the physician be in the form of a regular salary, or whether it should be computed in proportion to the visits the doctor succeeds in making, or in proportion to the number of permanent clients he succeeds in attracting, or whether he should be remunerated in inverse proportion to the amount of medical aid he is forced to give, as the Chinese are supposed to do — all these are questions in which the medical profession should and will be heard.

The present methods are admittedly inefficient and wasteful. The preposterous charges for expert surgical aid are sometimes defended on the grounds that operations are few and far between. The working man cannot afford to pay for the time the physician wastes as well as for the time he works.

There is only one way which has yet been devised to meet this economic and ethical problem; a system of insurance which meets the economic loss of illness half way, and a system of organized medical aid which reduces its cost substantially without pauperizing the patient or degrading the physician. Social insurance against sickness meets both these problems. The medical profession can fulfil the time honored oath of Hippocrates by giving to it a modern broad social content and by helping instead of hindering the development of social insurance.

A General Hospital For All Nations.

Over a million immigrants arrived at the port of New York last year, — a total about equal to the population of Boston and Washington combined. Of these million immigrants who (in 1914) after a journey of from five to sixteen days, passed through the immigration station at New York, about one out of every hundred was sent to the Ellis Island Hospital, an institution which has been aptly called, "a general hospital for all nations."

These 1,000,000 people represented every nation of Europe and a number of other countries. All levels of society were included, — truly a heterogeneous multitude speaking many tongues, and with habits and tastes as strange to us as they were to each other. To house, feed and care for this polyglot mass of humanity offers many difficulties not ordinarily encountered by civil hospitals, but it is a problem which the United States Public Health Service has had to solve at Ellis Island.

A modern steamship often brings over on one trip more than 2,000 steerage passengers. Consequently, the hospital facilities at Ellis Island must be sufficient to handle any epidemic. It is not unusual to receive a hundred cases or more in one day, and an approximately equal number must be discharged, if possible, to make room for the new comers.

Each immigrant is inspected by the ship surgeon before the vessel leaves the other side, so that most of those who are ill have become so since they left home. The medical inspection of arriving immigrants is made first, to see that they are strong and well and bright enough to make a living; and second, to ascertain that they do not have certain diseases which would endanger their new neighbors.

The hospitals are modern in every respect and well equipped. There are 275 beds in the main hospital and 450 in the contagious department. Some of the physicians and employes can speak one or more foreign languages, and all on the staff have picked up a few useful words in several tongues.

When it is absolutely necessary for diagnosis or treatment of ailments to have an interpreter, one is borrowed from the regular corps. After a time a surgeon learns to diagnose cases without holding much communication with the patient, just as one does in treating young children. The laboratory findings of the pathologist are of greatest importance in deciding obscure cases.

A far more difficult problem than diagnosis is the attempt to feed all these different races from one general kitchen. While patients are really ill and in bed simple articles of diet suffice; when they are kept for a long time recovering from a protracted illness, it becomes necessary at times to throw dietetic teachings to the wind. A little Arab girl after an appendectomy refused all our food until she was nearly starved, but she ate greedily a most villainous looking form of native sausage and cream cheese which her mother brought to the hospital; and on that most unpromising diet she made a splendid and uninterrupted recovery. The orthodox Jew asks for kosher food; the Hindoo loses caste if the hands of any stranger touches what he is to eat. Fortunately, most of these creeds permit of unrestricted diet for the sick, but the problem often has to be met.

An intelligent study of the diseases treated at Ellis Island gives a good idea of just what maladies travelers at sea are liable to contract. It is necessary to maintain a psychopathic pavilion for the mentally deranged, and a very large hospital for contagious diseases.

Insane people are very apt to travel — sometimes to escape imaginary persecutors, or to avoid social ostracism or to find employment which they cannot obtain at home. Sometimes relatives will furnish a troublesome individual with money to emigrate in order to get rid of him. Such aliens are often detected by the steamship surgeon while en route, or are diagnosed by the medical officers when inspected.

The crowded condition of the steerage especially favors the spread of any communicable disease. Several years ago 94 cases of measles were taken from one vessel.

About half the admissions to the hospital are for the purpose of making examinations for ailments like tuberculosis, syphilis, trachoma, and favus. These patients are detained in the hospital not only to aid in the examination but also to insure that the necessary precautions are taken to protect the health of those coming in contact with them. These cases are most difficult to handle when they are told that they cannot enter the promised land, for they do not realize that they are sick, and it is useless to try to calm, reassure or reason with them. The more excitable burst into tears and protest loudly, the more stoical accept this new disaster merely as another portion of that heritage of woe into which they have been born.

Various social workers render valuable services to patients who may be in need of advice or help. The very evident helplessness of these unfortunates is their best appeal to the sympathies, and every one connected with the institution takes a greater or lesser part in doing a little to help them along their way. — Abst. *The Survey*, 1915.

A Proposed Method of Hospital Standardization.

The hospital of today occupies a very much broader field of work than did the hospital of a century ago. Its functions include not only the care of the sick, but also the prevention of disease, the scientific study of causes and the treatment of disease, and the systematic education of doctors, nurses, and the public.

Many different plans have been proposed with a view to increasing the efficiency of hospitals in the United States. Three committees have urged the Carnegie Foundation to prepare a report on the classification and standardization of hospitals — a report that would perform as great a service for the hospitals of this country as the report on "Medical Education in the United States" has already performed for medical schools. These committees realize that they must propose a plan that will not be objectionable to the hospitals, and one that some agency could carry out. It would be possible for some properly constituted authority:

(a) To prepare a schedule for the classification of hospitals providing for a number of different groups, each of which would include those institutions which are sufficiently similar to be comparable.

(b) To make a study of all the teaching hospitals in the country.

(c) To define standards by which to measure efficiency in each of the proposed groups so as to make it possible for the managers of any hospital to apply the standards themselves and to measure the efficiency of their own institution.

(d) To include in the report a study of the work done by hospitals for the education of doctors, nurses and the public.

Such a report would be of service to the medical schools since it would help them to develop more effectively that side of their work which must be done in a teaching hospital. It would be of service to the nursing profession since it would define standards for the training schools for nurses. At present many schools are sending out each year large classes of young women who are allowed to become graduate nurses without having received an adequate training for the work.

It would be of service to the public since it would make clear the necessity for including in the organization of every hospital some provision for protecting the interests of the patients. Steps should be taken to enable the public to determine which hospitals are entitled to their confidence.

The proposed study of hospitals should result in establishing a Central Hospital Bureau, that

(a) Will place within the reach of every hospital in the United States the latest information in regard to hospital organization, management, construction and equipment.

(b) Will make the necessary tests and establish standards of quality and price for the medical, surgical and household supplies ordinarily used in our hospitals, and will thus help every hospital, large or small, to save the money now wasted in purchasing supplies without a full knowledge of current market conditions.

(c) Will help to develop a community program for hospital work with a view to preventing the unnecessary duplication of expensive equipment and the overlapping of work that have proved so wasteful under the present system.

(d) Acting in an advisory capacity, will aid individual hospitals in their efforts to increase their own efficiency and to make the best use of the funds entrusted to their care.

The proposed Central Hospital Bureau with its skilled organization, its complete hospital information, its modern systems of investigation and record, its staff of hospital consultants, expert accountants and auditors — all at the service of each hospital will make it possible for the smallest institution to be conducted with the same precision and skill as the largest and for all of them to effect a great saving in their expenditure of time, money and human effort. — Abst. from "*The Modern Hospital*" for Feb. 1915.

The Future Crusade Against Tuberculosis.

The factors which reduce the resistance of the individual will be fought in the future crusade against tuberculosis. The discovery that practically all persons in a community are tuberculous and that the resulting auto-inoculation protects against outside infection has not yet been fully appreciated. Consumptives are practically harmless to the average adult because of the widespread prevalence of tuberculosis in latent form. As far as babies are concerned, consumption is a contagious disease. We must teach the people that when an individual becomes a consumptive, it is not a new infection, but something has reduced his resistance and a latent disease has become aggravated. Physicians who have studied the disease state that a new infection of a city adult is exceedingly rare. Environment has been shown to be the determining influence, and environment must be emphasized as the fundamental factor. This truth has become more generally accepted as evidence accumulates. — Abst. *American Medicine.*

Tuberculosis — An Important State Problem.

Gov. Craig, of North Carolina, in his message, read before the general assembly on January 7, showed his appreciation of how serious a state problem is the control of tuberculosis. In the following extract from his message, the italics are ours:

"The problem of dealing with tuberculosis is most serious. In North Carolina it has been ascertained that 18,000 people are the victims of this disease. Many may have it of whom we do not know. It is an ever-present plague that stalks abroad at noonday, and one-seventh of all the deaths in the state are from this dreaded disease. The state sanatorium was established in response to the demand that something must be done for the afflicted, and to stop the ravages of the plague. In my opinion this institution, with its present scope and efficiency, is utterly incapable of dealing effectively with the situation. As an institution for the purpose of educating people to care for themselves and disseminating knowledge of the disease, it can not be as effective as could a bureau established for the purpose of sending literature to every person in the state known to be afflicted. Such literature could present the situation more intelligently to the people and with more efficacy than could be done by a few people who are fortunate enough to secure admission to the small establishment at the sanatorium. There are now about 90 patients in this institution. It is most humanely and most ably managed. Yet it is altogether inadequate to deal with this stupendous proposition that so vitally affects the people. It has done good in individual instances, but there are thousands in the state who can not gain admittance, and who will desire admittance when its efficiency is recognized. This institution can never care for those entitled to admission. On the present plan the whole revenue of the state could not meet the demand. *It is one of the highest obligations of the state to deal with this disease, to do all possible to prevent it, and to cure those who have it.* I hope that this general assembly can work out a practical method that will be effective." — *Public Health Reports,* 1915.

The Spread of Tuberculosis.

Dr. H. G. Lampson, of the Division of Preventable Diseases, Minnesota Department of Health, reports on the spread of infection in certain tuberculous families in five counties in Minnesota as a result of a special study covering a period of five months. Ninety-seven family groups were studied and charts were made for 449 individuals. The chief difficulty encountered was the unwillingness on the part of many persons to submit to examination. His conclusions are:

1. A very large percentage, 79 per cent, of the individuals fully exposed for a long period of time to open cases of tuberculosis became infected.

2. A much smaller percentage, 28 per cent, of those partially exposed or exposed for a short period of time became infected.

3. The percentage of infections from casual exposure, such as everyone encounters was small — 8 per cent.

4. The more frequent infection of children may be explained, at least in part, by their more intimate contact with the patient.

5. At all ages the intimacy and length of exposure are the determining factors in infection with tuberculosis. — Abst. *Public Health Reports.*

"Tuberclecide" Not Investigated.

Inquiries are constantly being received by the United States Public Health Service in regard to a preparation called "Tuberclecide," the advertising literature of which appears to indicate that an investigation of the curative value of this compound has been or is being made by direction of the President.

In order to avoid possible misunderstandings on the part of the public, it is necessary to state that no investigation of the preparation in question has been made or is contemplated by the Public Health Service; in fact, such investigation was specifically declined. All inquirers in regard to this matter have been referred to the statements on tuberculosis in Public Health Bulletin No. 36:

> Rest, pure air, and good food are the three essentials in treatment * * * There is no drug known, however rare or expensive it may be, that has any special curative action on this disease, and all remedies advertised as such are to be avoided * * * There are many symptoms peculiar to each case which may require medicines, but what is good for one patient may be very bad for another.

The title of the bulletin above referred to is "Tuberculosis — Its Nature and Prevention." Other publications treating of the same subject are Public Health Bulletin No. 35, "The Relation of Climate to the Treatment of Pulmonary Tuberculosis," and reprint No. 221 from the Public Health Reports, entitled, "Tuberculosis — The Financial Aspect of the Sick Leaving Home in Search of a Beneficial Climate." Copies of any of these can be obtained by making a request of the Surgeon General, U. S. Public Health Service, Washington. — *Public Health Reports,* 1915.

The Prevention of Communicable Diseases.

Recent investigations and discoveries in regard to the transmission of typhoid fever, whooping cough and diphtheria have materially disproved former opinions in regard to the dissemination of communicable diseases. Forty years ago the prevalence of disease in a community was supposed to be due to some peculiar composition of the atmosphere, and clothing, furniture, books, letters, etc., were considered important factors in spreading disease. Modern theories and laboratory experiments show that the discharges of the nose and throat, together with the urine and feces are the real infecting agents. This theory also shows that these diseases are communicable much earlier in their course than was formerly believed and for this reason a child in the early stages of diphtheria can infect many children in a schoolroom before the disease is manifest or active symptoms appear. Proper care of the throat, mouth, nose and teeth is a very important feature in preventing the spread of infectious disease. It is impossible to eliminate or disinfect these discharges of the body, but it is possible to so isolate the patient that contact with others is entirely eliminated and the disease confined to the sickroom alone. The public should be instructed in regard to the means of transmission and prevention of communicable diseases. — Abst. *Medical Review of Reviews,* 1915.

Natural and Artificial Immunity in Diphtheria.

Diphtheria is of great interest to public health workers, because not only does it represent the pioneer achievement in prevention, but our knowledge of the disease is probably more complete than of any other infectious disease. Natural and acquired immunity to the disease have been the subjects of greatest interest, and the varying types of active and passive immunity have been thoroughly studied. Hans Kleinschmidt has recently made a most comprehensive survey of this field and has published his results in the Beiträge zur Klinik der Infectionskrankheiten und zur Immunitätsforschung. He states that 93 per cent of new born infants have an antitoxin in their blood similar to that which is artificially developed in animals, or which results in a human being from an attack of the disease. Of infants one year of age 57 per cent are immune, and 37 per cent of children from 2 to 5 years of age also possess an immunity to diphtheria. The proportion of those immune increases to 50 per cent from the third to the fifteenth year, and this number is further increased to 76 per cent between the ages of twenty-one and forty years. After forty years the immunity diminishes to 48 per cent and maintains this proportion to the sixty-fifth year. These figures are of interest as they represent the clinical experience as to the age incidence of diphtheria. The natural immunity of the mother is transmitted to the foetus in utero and the nursling receives antitoxin in the mother's milk. The immunity of individuals can be detected by the Schick reaction. If one cubic centimeter of the blood contains more than 1/30 unit of antitoxin the reaction is negative; if less, positive. In case of obscure paralysis the Schick reaction may be used to detect the presence of antitoxin in the blood, presumably the result of a mild attack of diphtheria. The recent announcement of Behring of the value of his toxin-antitoxin mixture is interesting, but the fact that the immunity requires from ten to fourten days to develop restricts its usefulness. Kleinschmidt states that the process may be made more valuable by the simultaneous use of passive and active immunization. — Abst. *Medical Record,* 1915.

Pellagra in Minnesota.

Until November 1914, four cases of pellagra had been reported to the State Board of Health of Minnesota.

The first case was that of a man, fifty-three years of age, who had formerly resided in North Dakota. He died in June, 1913, after an illness of three years.

The second case, a woman from McLeod County, died in a hospital in Minneapolis.

The third patient, a woman of forty-five years, was a resident of Minneapolis. She died in April, 1914, after an illness of two years.

The fourth patient, a woman fifty-five years of age, resided at Rochester and died in June, 1914, less than two years from the date of the initial symptoms.

Heretofore pellagra has been found largely in the rural districts of the south and it is rather surprising to discover four cases in one of the largest cities of the northwest. Some cases of pellagra do not show definite cutaneous symptoms and because of this fact may pass unrecognized by physicians who are not familiar with the disease.

One case after being kept in the city hospital in St. Paul showed marked improvement. This man, thirty-five years of age, was a Cuban laborer but had lived in the United States since he was four years of age. He had traveled from place to place and spent much time in railroad and construction camps. For several years he ate corn bread excessively and at times the meal from which the corn bread was made had moulded while in the damp store car. He was robust, six feet one inch in height and weighed 165 pounds. His personal and family history were unimportant. The dermatitis for which he sought treatment covered the face, neck, dorsal surface of the hands, and lower one-third of the forearms, and contained many corn and wreath shaped figures. The eruption on the hands and arms was typical and of a deep red or purple color, while the skin was thick and hypertrophic. There was some edema of the face and ptosis of the left eyelid. Loss of appetite, constipation and severe headache were the most prominent symptoms. The blood picture was negative and two Wassermans were negative. An examination of the urine showed the presence of indican in great quantities but was otherwise negative. The patient was kept quiet and givèn a nourishing diet. The medicinal treatment was Fowler's solution. At the end of seven weeks he was much improved both mentally and physically. The eruption had almost disappeared and the patient was able to assist in the general work about the ward.

Rocky Mountain Fever.

Since 1902 it has been generally recognized that Rocky Mountain spotted fever is a disease that prevails in certain localities in the Western States. As a result of researches, notably those of Wilson and Chowning, Ricketts and his associates, and of representatives of the Public Health Service, we now know the means by which the disease is spread from individual to individual, and from one locality to another. A recent report by the Public Health Service on this disease shows it to be present in nine Rocky Mountain and Pacific Coast States. Cases have been reported during more than one tick season from certain localities within these states, and these localities are recognized as being definite areas of infection; that is, they harbor infective wood ticks capable of transmitting Rocky Mountain spotted fever to human beings by their bites.

Outside of the Snake River Valley in southern Idaho and the Great Basin region, the infected areas are rather definitely outlined and small in extent as compared with the total territory in which they are included. The disease is known to be present only in restricted areas of southern and southwestern Montana, southeastern Washington and northeastern California.

The Study of Rocky Mountain spotted fever, however, has been both too brief and too incomplete to determine whether the disease is at present spreading into uninfected territory or what the danger of its future spread may be. Wood ticks remain close to the place where they are hatched, and none of the animals which have been found susceptible to Rocky Mountain spotted fever infection are great travelers. Infection in animals is an acute condition so that there is slight danger of their spreading the disease in the way that rats spread bubonic plague.

Rocky Mountain spotted fever is spread by infected adult wood ticks attached to their animal hosts, either domestic or wild. These large animals may travel many miles before dropping the engorged ticks. This is the probable method by which the infection was spread by deer, elk, buffalo and range cattle.

Real danger exists in the shipment by rail of elk and domestic animals which may harbor infected ticks, to points within a radius of at least ten days' travel. Eastern ticks are capable of transmitting Rocky Mountain spotted fever and it is possible that infected ticks introduced in this way into any heavily tick-infested part of the United States might establish foci of infection. The process would probably require very favorable conditions and several years' time for its completion. In the meantime the introduction of the ticks will have been forgotten and the true nature of the first case perhaps remain unsuspected.

For these reasons it is well to keep a watch for suspicious cases occurring in the spring and early summer among persons who have been exposed to tick bites.

Sheep grazing has been proposed as a tick eradicative measure. It depends on, first, the removal of undergrowth and the consequent destruction of good tick country by close grazing; second, the destruction or removal from the sheep range of other animals, domestic and wild, which may serve as hosts for adult ticks; third, the destruction of the ticks themselves, principally by tangling themselves in the wool of the grazing sheep; fourth, the placing of the problem of tick eradication on an economic basis, so that it may be carried out on an extensive scale without cost to the government, the state or the inhabitants of the valley.

The experiments made during the past season were conducted with two bands of sheep numbering about 1,500. The experiments were begun about the middle of April and terminated about the middle of July, when the sheep were sheared, dipped and returned to their owners. During the experiments, sheep of both bands were searched for dead and live ticks, and it was estimated that over 25,000 adult ticks were destroyed by the 1,500 sheep during this period.

All the observations so far made, says *The Journal of the American Medical Association,* point to sheep grazing, certain important principles being borne in mind, as a practical, rapid, efficient and economical method of tick eradication in the Bitter Root Valley.

New Uses of Specific Skin Tests in Certain of the Infectious Diseases.

The tuberculin reaction is used practically only as a diagnostic means. This article is a discussion of the extension of the use of local specific reactions to the diagnosis of other infectious diseases, and of certain other uses of these reactions which are of distinctly prognostic significance. Koch knew that certain specific reactions followed the use of his tuberculin, but it was not until seventeen years later that Von Pirquet and Calmette placed tuberculin to practical use as a diagnostic agent. Up to the present an application of the principles developed by these men has been used with success in the diagnosis of hay fever, glanders, gonorrhea, leprosy, trichophytosis, sporothricosis and the infectious abortion of cattle. Dr. Claypole has been able to develop specific cutaneous reactions in connection with streptotrichosis to such an extent that even the different members of this group may be differentiated by this means. Claypole has endeavored to classify streptothrices with some success. Streptothrices have been found in cases of cervical adenitis clinically indistinguishable from tuberculous glands. An acid-fast streptothrix may be recorded in laboratory results as the tubercle bacillus. By means of Dr. Claypole's differential cutaneous test, streptothrix infections may be readily diagnosed. The solutions were prepared in all respects similar to old tuberculin from two types of streptothrix. Forty-five control cases which showed no evidence of tuberculosis were first tested with old tuberculin and the streptothrix solutions. Seventy-two reacted to tuberculin; none to the streptothrix solutions.

Fifty-five suspected cases of suspected tuberculosis were next tested. Thirty-seven reacted to tuberculin, and thirteen to the streptothrix test. Of the thirteen streptothrix H. reactions eleven were lung cases, and in nine of these no tubercle bacilli were found, but in all nine Gram-positive organisms resembling streptothrix H. were demonstrated. In only one of the other cases was the tuberculin reaction positive and in this one acid-fast organisms were also found. Eight cases reacted to strepthocin E., six with lung involvements and two with bone lesions. Three of the lung cases were negative to tuberculin and had no tubercle bacilli in the sputum.

Jenner noted that when variolous matter was inoculated into a person immune to smallpox, a more speedy inflammation resulted than when the individual was susceptible. This phenomenon was studied by Von Pirquet and its public health significance brought into prominence by Dr. Force. If in twenty-four hours following vaccination this reaction is present, it indicates immunity and obviates the necessity of re-vaccinating at that time. This test will also differentiate variola from varicella as a previous attack of smallpox, like a recent successful vaccination, determines the reaction. The luetin reaction of Noguchi is another skin test possessing some prognostic value. A pure culture of Tr. pallidum is applied to the abraded skin. It occurs only in cases of syphilis. It has been noted in 80 per cent of late tertiary cases, and may occur when the Wassermann is negative. Energetic anti-syphilitic treatment increases its incidence. The luetin reaction indicates allergy. The Shick test indicates the absence or presence of antitoxin in the blood. Individuals who react have less than 1/30 of a unit of antitoxin per cubic centimeter of blood and are not protected against diphtheria. Those who give a positive reaction do not respond well to active immunization and should be given antitoxin. In connection with work on a skin test as an indication of immunity against typhoid fever, Gay and Claypole have developed a vaccine in which the reaction is much lessened and the protection persists for a longer period, at least in experimental animals. The typhoidin test of Gay and Force is believed to indicate the real measure of resistance in an individual to typhoid fever. In 41 of 42 cases that gave a positive history of typhoid fever, the skin reaction was positive. Eighty-six per cent of 42 cases that gave no history of typhoid fever reacted negatively. The cases in this group that reacted probably represent abortive or latent attacks. This test is so delicate that it even differentiates between rabbits that have been incompletely and completely immunized. The mechanisms of the typhoidin reaction are probably to be explained by the union of antigin and antibody, and our experiments would tend to show that the antitoxin is present in the circulating blood and not in the cells. — Abst. *Amer. Jour. Med. Sciences,* 1915.

A New Typhoid Vaccine.

Prof. F. P. Gay recently announced a new typhoid vaccine. It is claimed for this vaccine that there is practically no reaction and that a longer period of immunity results. In preparing this vaccine the sensitized bacilli are killed with absolute alcohol, centrifuged, then dried and ground. The upper layer is rejected, as it contains toxin but confers no immunity. He advises the use of a polyvalent strain from the locality where the disease exists. Using an evaporated culture of typhoid bacilli grown on 5 per cent glycerin bouillon, and inoculating the skin as in the Von Pirquet test, Gay found that the immunity conferred by the old vaccine lasts only a few months. In the present war the censor has prevented exact accounts of the results of the typhoid vaccines used from becoming public. In the British army its use is not compulsory. The French are still seeking a vaccine which can be used on the firing line without bad results. — Abst. *American Medicine.*

Milk Bottle Sanitation.

Modern progress in sanitation and preventive medicine has taught the value of keeping articles of food properly wrapped or in covered cases when placed on exhibition. The question of pure milk supplies is being studied in every city and yet very little thought is given to the actual sanitation of milk bottles. Investigation shows that consumers not only fail to cleanse their milk bottles but frequently use them for other purposes. Often the milk bottles are thrown into the ash cans and are hauled to the city dumps where they are rescued for commercial purposes and returned to the dairymen. From an economic standpoint also should the proper return of the milk bottle be advocated, for the loss to the milkmen of unreturned bottles aids much in raising the cost of milk production and increases the cost for the consumer. The basis of this negligence in handling milk bottles is in the home of the consumers and they should be taught the importance of keeping these bottles clean and sterile and also that it is almost impossible to secure clean, pure milk when delivered in dirty, insanitary containers. — Abst. *Medical Review of Reviews,* 1915.

The Health of Our Summer Resorts.

Many of our summer resorts have acted on the policy that a good climate, charm of location and beauty of scenery are sufficient inducements to attract the summer visitor; but nowadays people are more wary and wisely look for more than this before selecting a vacation playground. The visitor wants a clean bill of health from the resort he has chosen, and is entitled to have one. Vacation typhoid is becoming known as a serious hazard. The prudent recreation seeker now finds out in advance whether or not this infection prevails at the place he has in mind, and furthermore learns what sanitary measures are being taken there to safeguard the health of the summer colony. The town of York, Maine, has recently taken steps that at once place it in the forefront of progress as far as health is concerned. The way the problem was met may well serve as a model for other summer resorts. Last year there were a number of cases of typhoid fever at York. No attempt was made to conceal the fact of the existence of the disease and its extent. The authorities very properly felt that the way to meet any danger was to face it in the open. An expert was invited to come to York and make a sanitary survey. The chief recommendation of the expert was that York needed a full time health officer. The town appropriated $2,500 a year for this purpose and appointed Mr. William Eustis Brown, a graduate of the School for Health Officers of Harvard-Technology, to the newly created position. The town of York is now spending one dollar per capita per year for health, a larger sum than is appropriated by any other American city directly for a like purpose. "Public health is purchasable," the price is moderate, and York shows by its action that it intends to enjoy the best attainable protection from disease. Other summer colonies will find it to their advantage to follow the example of York, and take the necessary measures to safeguard their citizens and the strangers within their gates. *The Journal of the American Medical Association* strongly advises the public to demand the security of health that only a well-ordered sanitary department can furnish. Our sea-shore and mountain resorts can no longer depend on nature and luck for a clean bill of health.

Sanitary Investigation of Navigable Waters.

The sanitary investigation of navigable waters, authorized by Congress in August, 1912, has been undertaken by the Public Health Service. Three types of waters were selected, the Ohio River, the Potomac River and the coastal waters along the Atlantic and Gulf shores. The watersheds of these present fundamental problems, the solution of which will be of great economic as well as sanitary value. The Ohio River is a source of water supply as well as a means of sewage disposal. The Potomac is a tidal river and is the home of great shell-fish industries. The salt waters of the ocean shores furnish no water supply, but are the receivers of sewage, and the situation of shell-fish beds. The results of the investigations of these fundamental types are expected to serve as a standard in subsequent investigations of a similar nature.

The Ohio River was chosen for the study of sewage disposal and the self purification of streams. Its length, and the fact that it has numerous cities along its course, make it peculiarly appropriate for such investigation. Cincinnati, Pittsburgh, Wheeling, Portsmouth, Louisville and Paducah were selected as the centers from which to pursue the study. The work embraces the study of the extent, character and population of the watershed of the Ohio, the amount and character of sewage discharged, the effect of the sewage on the river and of the river on sewage, and a complete survey of the stream and its various branches. Samples of water are collected daily and submitted to bacteriologic, biologic and chemical examination.

In the same way an exhaustive study of the Potomac River has been made. In addition to the problems presented by the Ohio there is the relation of shell-fish beds to other conditions of the river. A similar question is involved in a study of the coastal waters of Chesapeake Bay and its estuaries, the gulf and its estuaries, Mississippi Sound, etc.

All the questions involved in the sanitary survey of navigable waters, says *The Journal of the American Medical Association,* are of immense interest to the public health, not only to the communities most directly affected, but also to the whole nation.

Winter Flies.

The winter season, naturally, is not the period in which most persons are likely to take measures to prevent the breeding of flies. In the summer, when the flies are thick, the wish will be frequently heard that preventive precautions had been taken. In the course of an inspection, January 7, by the sanitary bureau of New York, in response to complaints regarding a heap of manure, dirt and rubbish not far from a public school in a crowded district of the city, a rather startling state of affairs was revealed. The heap of manure was found partly covered with tar paper and rubbish in which, despite the cold weather prevailing — and there had been not long before a series of days with the temperature well down toward zero — flies were observed to be actively breeding. The *Bulletin* remarks, "This emphasizes the importance of properly caring for horse manure throughout the year and teaches anew why the filthy fly is always with us." Until definite precautions are taken during the winter to prevent the accumulation of heaps of filth and particularly piles of horse manure, in exposed situations under conditions favorable for breeding, the fly will probably continue to be the nuisance and the serious danger to health that it has always been. But it must not be forgotten, says *The Journal of the American Medical Association,* that whenever we are ready to get rid of the fly nuisance, our boards of health can accomplish this purpose without enormous trouble, probably after the first year without much additional expenditure in the budget, and with little annoyance to the public generally. When it is recalled how much the absence of this undesirable pest would mean for children alone in our crowded city life, it should not be long before there is a general awakening to the necessity of taking the now well-recognized precautions during the winter that will secure great limitation, if not entire obliteration of fly breeding.

Cancer — A Disease of Many Forms.

People commonly think of cancer as a single definite disease, as distinct and uniform in its nature and symptoms as appendicitis or typhoid fever. This is a misconception. It is nearer the truth to regard "cancer" as the name of a group of quite different diseases which have one feature in common. It has been said that the layman's conception of cancer is of something very indefinite, very portentous, quite hopeless, a disease which always affects someone else than himself, and about which he carries no immediate interest or responsibility. If this is a fair statement, the layman is wrong on practically every count, and his error and confusion is probably due, in no small part, to the failure to take account of the many forms of cancer. If this were done, perhaps the patient would not so frequently yield to despair and throw away the excellent chance of cure that exists when the disease is first discovered.

As a matter of fact "cancer," in the light of modern knowledge of human ailments, is almost as general and vague a term as "fever." The word covers a number of entirely distinct diseases, differing widely in their origin, symptoms, treatment and curability. The various kinds of tumors have little in common except that they are all forms of new and lawless growths of body cells.

This false notion of cancer as a single disease has probably hindered progress toward the understanding and control of the various diseases which are conveniently grouped uner that term. All forms of cancer are aspects of new and lawless cell growth, and it is the inner nature or "cause" of such growth that we do not yet understand.

The essential point for the man in the street is that each different kind of cancer is a separate disease. If he is so unlucky as to be attacked by any one of them, it would be well before becoming discouraged to go and find out which form he has. If he is taken with a "fever" and it happens to be German measles, his outlook on life is quite different than if it chances to be virulent small-pox. So, also, a "rodent ulcer" on the face is quite different from cancer of the stomach. And lastly while one is a more serious disease than the other, there is always hope if it is recognized and treated at once. Why not give the surgeon the same chance with cancer as he has with appendicitis? Suppose all symptoms of that disease were neglected and hidden until the appendix had burst? Doubtless the surgeon would still save a certain percentage of cases, but would the record be anything like it is now? It is the intelligent co-operation of the patient and the family physician that has conquered appendicitis, and the same weapons are even more needed in the fight against cancer.

Is Cancer Increasing?

The report for 1912 of the Registrar-General of England and Wales gives the cancer death-rate as 1,019 per million as compared with 993 for 1911 and 939 for the five years ending with 1910. Nearly every important registration office in the world reports a higher cancer death-rate every year. The assumption must not be too quickly made, however, that cancer itself is increasing at such a rate as to cause alarm. Many authorities hold that the recorded increase is the result of improvements in medical and statistical science. Physicians and surgeons now recognize obscure diseases as cancer and correctly ascribe to this cause many deaths that in former years found their way into general or uncertain classifications.

Since the only hope of curing cancer lies in its early recognition and treatment, the question of whether or not the disease is on the increase is relatively unimportant. In 1912, 46,531 deaths were recorded in the registration area of the United States as due to cancer and other malignant tumors. This includes about 60 per cent of the population. It is therefore evident that there were in 1912 about 75,000 deaths from cancer in the entire United States, as compared with perhaps twice as many from tuberculosis and one-fifth as many from typhoid fever. In most of these cases the patients had some clear indication of the approach of the disease. If they had known the signs and had acted on the warning at once very many of them might have been alive today. When science discovers more about the ultimate nature of the disease we may devise some method of treatment which will cure the weak, ignorant and foolish persons who neglect the warning, as well as the alert and wise people who recognize and act on it. Meantime, we have no other safeguard against cancer than our own wisdom in seeking the best medical advice on the appearance of suspicious symptoms, and the best surgical treatment if the disease is found to be present or threatened. There is no occasion for undue alarm or panic. Fear will not produce cancer, nor will neglect and mysticism cure it. It is an unpleasant fact to be faced with cool intelligence and prompt courage.

Every lump in the breast should be examined. It is not necessarily cancer, but it may be. Cancer of the breast occurs in men as well as in women. In external cancer generally there is something to be seen or felt, such as a lump, a wart or mole that shows signs of irritation, or an unhealed ulcer or sore. Pain is not usually present at first. Internally, cancer may often be recognized by symptoms before any growth can be seen or felt. In persons more than 35 years old persistent "stomach trouble" with loss of weight and change of color is especially suspicious. The normal change of life does not lead to increased flow, which is always suspicious at this period of life, as is also a return of the flow in later months or years after it should have stopped. These and other warning signs should take a man or woman promptly to a competent medical adviser.

New Light on the Prevalence of Cancer.

The Director of the Census has recently announced plans which promise an important extension of our knowledge of cancer. At the suggestion of the American Society for the Control of Cancer he has ordered the publication of the mortality statistics of this disease in much fuller detail than hitherto. As soon as the 1914 returns are received from the states and cities which make up the United States Registration Area, they will be made the subject of a special cancer monograph. When the figures are subsequently published in the annual report of the Division of Vital Statistics ,the deaths from cancer will be grouped under some thirty headings, instead of only seven, as heretofore. This means that the returns of deaths from malignant disease will be classified by parts and organs of the body affected, as in the standard reports of the Registrar General of England and Wales. While this change may not at first appear to be of consequence to the public, it has practical bearings that may prove of considerable importance. This detailed analysis of cancer mortality in the United States should bring out new and useful information as to the prevalence of the disease, and thereby contribute to the better understanding of its controllable features. Such a study as the Census Bureau purposes to make should also throw clearer light on the question of whether or not cancer is really increasing. The foremost authorities have repeatedly urged that this question can be scientifically answered only by studying separately the facts in regard to each of the many forms and sites of malignant disease. The last report of the Imperial Cancer Research Fund again warns the public to disregard statements of the increase or decrease of cancer as a whole, but to seek light rather from comparing the figures for cancer of the stomach, cancer of the tongue, cancer of the breast, etc., for successive years. By the progressive action of the Director of the Census the detailed information as to the parts of the body affected, on which such studies can be made, will now be made public for the first time in the official statistics of the United States.

Morbidity Statistics.

"Records of Health and Sanitary Progress" is the title of an article by Professor Robert E. Chaddock of Columbia University in the December number of the American Statistical Association Quarterly. The writer emphasizes the need of learning more about health conditions as a necessary preliminary to work for improvement of these conditions. An example is given of a town of 4,000 inhabitants which compelled a railroad to spend the equivalent of $1,500 a year to eliminate a grade crossing which had claimed ten victims in ten years. Yet this town expended only $150 a year on its health administration and had an annual death rate of 27.5 per 1,000 or nearly double that of the average community. The death rate from typhoid fever was nearly seven times the average. Yet this town was unconscious of its health situation and did not know the inadequacy of their [illegible] lives each year. Statistics show how possible it is by efficient health work practically to eliminate such diseases as typhoid fever. European cities in time of peace with better health organization average only four deaths per 100,000 from typhoid, while the average of the cities of similar size in the United States was 25 deaths per 100,000 inhabitants.

Vital statistics, records of births, deaths and disease, are the bookkeeping of the health movement. The measure of success or failure in health work is found in vital statistics. What affects either births or deaths, conditions the very existence of the population, while statistics of sickness and disability measure the possible efficiency of the existing population.* "No business firm would dare to be as careless of raw material and mechanical equipment as our communities have been of life and health." Vital statistics also show us where to look for bad health conditions and alone furnish a definite measure of the value of sanitary improvement and the progress of medicine and surgery. Vital statistics may be related to other social phenomena such as occupation, housing and nationality. For example the morbidity and mortality rates from tuberculosis vary according to living conditions, and workers in certain occupations are especially subject to certain diseases.

Public health is purchasable, and the administration of the health department of a city or state is a big business undertaking capable of yielding high dividends in lives saved and disease prevented. As in any business enterprise, no health department is in a position to spend money and energy wisely and to good advantage without good bookkeeping. Public health administration is everywhere hindered by lack of adequate funds, and the information collected through statistical work is necessary to arouse the public to the need of investing more money in public heath work.

Dr. Chaddock also emphasizes the value of tabulating data for smaller units of area in cities to guide the city health authorities in their work. Different health conditions prevail in different parts of the same city. Sanitary areas should be established so that frequent comparisons of results may reveal changes in health facts connected with changes in nationality, sanitation, housing, intelligence and other conditions. Averages for a whole city are likely to be misleading when some sections have very good and others very bad health conditions. The most important thing is not to know what the death rate for a whole city is, but why it is high in certain sections of a city. Unsanitary danger areas are a peril to the city as a whole.

The Value of Periodical Examinations.

Important personages the world over have always had physicians at hand to warn them of possible dangers. The poor man has had to run risks and thus the practice grew up of ignoring the doctor until we got sick. The science of preventive medicine has so conclusively shown its usefulness that people are all asking, "why get sick if it can be prevented?" The modern movement is to give every one, rich or poor, an opportunity to profit by the diagnostic advances of modern medicine, so that he may know of incipient disease and check it. We have long urged life insurance companies to annually examine policy holders, so that they may be sent to the doctor if something suspicious is found. The habit of being periodically overhauled by a physician is not a sign of hypochondriasis, but rather a means of prevention of many disablements and consequent loss of employment. — Abst. *American Medicine,* 1915.

The Conditions of Industrial Accidents.

The enactment of laws in various states on workmen's commen's compensation for injuries has aroused increased interest in the statistics and physical and psychic conditions of industrial accidents. The total number of these accidents is almost appalling. The lowest estimate places the fatal accidents to adult workers in the United States at 35,000 a year, with an additional 1,250,000 non-fatal accidents. The Massachusetts Industrial Accident Board, on the other hand, placed the number of workers killed by accident yearly at 75,000, which apparently includes not only adults, but also workers of all ages, while the number of injured of the same classes was placed by this Massachusetts authority at 3,000,000 or over. An earthquake in a foreign country that kills half this number of persons and maims one-fiftieth of those injured in our United States industries is spoken of as catastrophic.

A greater proportion of accidents occur on Monday than on any other day of the week. Accidents are said to be due often to fatigue. As, after the day of rest on Sunday, workmen should be less fatigued than on other days, some other factor must be sought to explain this feature of the statistics. It has been suggested that the "blue Monday" accidents are really due to the fact that workmen take more liquor on Sunday, and thus become unnerved and more liable to accidents during the following twenty-four hours. There is, perhaps, something in this contention, says *The Journal of the American Medical Association,* though it has been disputed. In the Massachusetts Industrial Accident Board Reports, in which the official figures are given, there is scarcely more than one-twentieth more accidents on Monday than on Tuesday, while Tuesday is not much above the average in the number of accidents reported for other days. Saturday, of course, shows a noteworthy reduction, because of the half holiday in some trades.

By far the larger number of accidents occur at about 10 a. m.

and 3 p. m. This fact is confirmed by the reports of two state boards, Washington and Massachusetts. The tendency to speed up employment has been incriminated, as the predisposing condition for the occurrence of accidents. This desire comes over the workman when he is not yet fatigued, but has been employed for several hours. He starts the morning's work "cold," and as he warms to his work, the danger of mischance because of haste becomes greater. Just when the speeding up reaches a climax in the morning hours, most accidents happen. The same thing is true in the afternoon. Workmen feel sluggish after their lunch, but after an hour of work warm up again, and by about 3 o'clock they are doing their most rapid work, and are at the same time more subject to accident.

With regard to accidents among children, however, there is no hour of maximum. Accidents occur at all times, and they are comparatively much more frequent among children than adults. The United States Bureau of Labor reported that "there is clear evidence of great liability to accident on the part of children. Though employed in the less hazardous work, their rates steadily exceed those of the older co-workers, even when in that group are included the occupations of relatively high ability." This was said with regard to the Southern cotton mills, but the same thing is true of practically all industries in which children are employed.

Railway Accidents in 1914.

Accident Bulletin 52 of the Interstate Commerce Commission for the year ended June 30, 1914, shows that there was comparative improvement in the number of accidents on the steam railways of the United States during the year. The total number of casualties for the year was 202,964, of which there were 10,302 killed and 192,662 injured, a decrease compared with the previous year of 662 in the number killed and 7,646 in the number injured. It is to be regretted that the claim of one or two of the larger roads of the country that no passengers were killed on their roads during the year does not apply to all roads, for among the number killed, 265 were passengers. Of the remaining number of killed, 3,259 were employes and 6,778 were other persons classified as trespassers and non-trespassers. It is astonishing to find that doubling the number of employes killed does not quite equal the number killed of persons in no way connected with railroad operation or management or traveling as passengers. It is likewise surprising to note that among the total casualties, 202,964, the killed numbered 409 employes, and the injured 113,274 from "industrial accidents," defined in the Bulletin as "accidents not involved in train operation, but occuring to railway employes, other than trainmen, on railway premises." The total number of employes injured was 165,212, the number of passengers 15,121, and the number of other persons 12,329. These figures represent a decrease from 1913 of 6,205 injuries to employes, 1,418 to passengers and 23 to other persons, and of 456 employes, 138 passengers and 68 other persons killed. Yet, in the opinion of *The Journal of the American Medical Association,* the vast and seemingly unnecessary disproportion between the employes and others killed and injured who have nothing to do with operating or riding on trains undoubtedly calls for further improvement in operating methods, as well as for greatly increased care on the part of both employes and the public to prevent the casualties which are unquestionably the result of individual carelessness.

Far-Reaching Effects of Lead Poisoning.

Lead poisoning has a detrimental effect on the offspring of the workers, whether male or female. Half a century ago Constantine Paul reported striking observations on the effects of paternal lead-poisoning — cases in which the father was subjected to plumbism, the mother being unaffected. He obtained the history of thirty-two pregnancies of this order; twelve of them resulted in the death of the child before birth; twenty children were born alive, but the mortality among them was extremely large, only two surviving the third year. Children so born were found particularly liable to various nervous affections. These unusual statistics, says *The Journal of the American Medical Association,* have not, so far as we are aware, been refuted.

In the University of Wisconsin, Cole and Bachhuber have shown the effect of lead on the germ cells of the male, in rabbits and fowls. The young produced by male rabbits poisoned by ingestion of lead acetate have a lower vitality and are distinctly smaller than normal offspring of unpoisoned males. In fowls likewise the poisoning of the male parent with lead results in offspring of lower vitality.

The outcome of these investigations furnishes food for reflection. Lead poisoning and the opportunities for it are by no means rarities. There are more than a hundred occupations in which industrial lead poisoning may more or less readily occur, and the cases of known intoxication from such sources reach into the hundreds in some of the larger cities. Plumbism may appear under most peculiar clinical guises and with most unexpected histories. These newly recognized features of the effects transmitted to a second generation complicate its manifestations more than ever.

Occupational Eye Diseases.

Many eyes are injured or lost from disease contracted in certain occupations. In some trades absorption of poisons produces serious eye disorders. Among these poisons are tobacco, alcohol, lead, bisulfid of carbon, nitrobenzol, aniline dyes, etc. One of the most dangerous is alcohol. Not the high grade grain alcohol but the cheap wood or methyl alcohol, sometimes masquerading under the names "Columbian spirits," "Colonial spirits," or "Manhattan spirits." This poison is sometimes drunk by ignorant people, and not infreqeuntly causes death and blindness. Even ten drops have produced such results in susceptible people. Turkish bath attendants and masseurs sometimes use wood alcohol with bad results, both to the rubber and the rubbed. The inhaling of wood alcohol in such trades as painting and hat making not infrequently produces blindness or fatal results. It is used as a solvent for shellac and if used in confined spaces is very dangerous. In a pencil factory, where wood alcohol was used, a roomful of girls suffered from serious disturbance of vision, which passed away with the removal of the cause. Wood alcohol under this or under any other name should not be manufactured or sold. It is too dangerous.

What is called denatured alcohol is just as cheap and comparatively harmless. Another vocational eye disturbance is found where eyes are unduly exposed to very bright lights, such as "blow-outs" or "short-circuits," where the light is sudden and intense. Such accidents may, by the overpowering influence on the retina, produce poor sight or blindness, partial or complete, for a variable length of time. Constant and intense electric light produces retinal exhaustion, and an excessive pupillary contraction, which secondarily overworks the muscle of accommodation, and occasions great ocular fatigue. People who work continually on polished surfaces such as gilders, metal polishers and glass workers experience the same troubles. Factories that are over brilliantly illuminated by incandescent gas and electric lights are apt to injure the eyes, as these lights contain much violet and ultra-violet rays which produce an effect on the eye similar to "snow-blindness." These rays may also seriously affect the eye. Stokers, bottle-makers, and glass-blowers, whose eyes are continually exposed to intense heat and light, are very apt to have cataracts and the eye nearest the fire is always the one first affected. Another kind of occuptional eye disease can be found in people who are compelled to work for hours at a stretch, on work that requires close inspection of small things. Bookkeeping, drawing, watchmaking, sewing and dentistry, all close work, require a strain of the muscle of accommodation, even if people have normal eyes. Many people have errors of refraction for which glasses should be properly fitted. Even if glasses are properly fittted, there is still an accommodation strain where the eye is unwisely taxed. This accounts for the headaches, tired and red eyes and nervous exhaustion so frequently seen in those who work long and hard at occupations requiring close visual exertion, and where at the same time perhaps the light is poor and badly arranged.

Shortsightedness is a disease aggravated by the close use of the eyes and is found in students, type-setters, etchers and engravers, in fact, in any vocation where close and continuous use of the eyes is demanded. The proper adjustment of glasses is essential in such cases, as well as health up-building, open-air life, proper lighting and the judicious use of the eyes, for it must be remembered that shortsightedness is a progressive disease and sometimes causes blindness. Shortsighted people should endeavor to secure some occupation which does not require the close and continuous use of the eyes.

Difficulties in Obtaining Ages.

POPULAR IGNORANCE AND CARELESSNESS REGARDING ONE'S BIRTHDAY AND AGE.

Recently, during a study of about 5,000 school children, whites and negroes, in counties X and Z, the point was brought out very strikingly that there is a very great carelessness or ignorance among school children in reference to their age and birthday.

Still more striking, this ignorance was not entirely absent from the parents.

Were the question of child labor in the mills at issue, discrepancies in data given in answer to questions would be expected, but the study involved school children who had no possible ground for deception and they knew I was their friend, hence they had no reason to fear me.

A few instances of the many cases that came to notice may be cited with profit.

If a child is asked his or her age the reply may cover the age at the last or at the next birthday. There seems to be no rule in regard to this point. If the question asks specifically for the age at last birthday, the age at next birthday will frequently be given.

High school white pupils, even in the junior and senior years, have given me two or even three different ages and it has been impossible for me to determine the correct age.

One boy of about 10 years assured me that he was "8, going on 12."

Girls of 15 have claimed to be 13 to 17 years old.

The question arises: Is a lack of knowledge of one's age a sign of lack of mentality? My experience would lead me to assume that while mental defectives and very young children may not know their year-age, no reliable conclusion as to mentality can be drawn, predicated upon this point, for among the many instances that have come to my notice was one in which a university graduate signed an oath as 3 years younger than the records showed him to be. This man acted in good faith and held to his point until the proof was produced that he was in error.

When children are asked the day of their birthday, correct answers will be obtained from the majority, but in my experience it is a common matter for a school pupil (even a high school pupil in some cases) not to know either the day or the month of his or her birth.

If, now, a pupil is asked for his or her age at last birthday, and answers correctly, and is then requested to give the year of birth, it is positively astonishing how large a percentage of children — even high-school pupils — will give erroneous answers. More than that, if parents are asked for the age and birthday, month and year, of their children, relatively few fathers can give correct answers, as far as my experience goes, and many mothers can not answer questions correctly.

A very small percentage of high school children or even of adults seem to know the age or birth year of their parents.

To gather trustworthy information from negroes as to age seems almost a hopeless undertaking, for about one-half of the negro school children questioned had no idea how old they were or on what day or in what month or year they were born.

The information gathered from white children is much more detailed and trustworthy than that gathered from negroes.

The foregoing remarks apply not only to families of laborers and farmers, but to educated families, to professional families, to leading families in a community, and they apply much more generally than one would suspect before attempting to gather the information.

The condition described is additional evidence in favor of a rapid extension of birth registration and issuance of birth-registration certificates to parents, for the subject is one of practical application not only in legal but also in medical matters.—Stiles—*Public Health Reports,* 1915.

The Early History of Opium.

The medicinal properties of poppy juice date from a remote period. Recalling the highly developed culture of the ancient Egyptians one is inclined to imagine that the narcotic properties of opium were known to them; but the investigations of Unger (1857) have failed to trace any acquaintance with opium in Ancient Egypt, and Dr. Ember, of the Semitic Department of Johns Hopkins University, knows of no reference to it in Egyptian literature. According to some Hebrew scholars, there is a reference to poppy juice in the Bible. In several passages in the Old Testament the word *rôsh* is mentioned. Professor Haupt is convinced that *rôsh* means the poppy, and so also is Professor Post. In the Talmud we have one reference to opium, under the name *ophion,* but that word was clearly borrowed from Greek. In the classical Hindoo literature there is found no reference to it. From the time of the Mogul Conquest on there appears a word *Khash-khash* which means poppy-seed, and *Khash-khasharasa,* juice of the poppy. In this it is easy to recognize our modern word *hashish;* and so it seems that at that early date the narcotics opium and cannabic indica were confused with each other. The original home of the poppy was in Asia Minor. From there it was carried to Greece at a later period.

It is not at all certain whether Hippocrates was acquainted with the juice of the poppy. According to Wootton, he refers to a substance called *mecon* to which he attributes a purgative as well as narcotic action. Some think that it was opium; others believe that he was referring to another plant. In any case, he made but very little use of the drug. The first authentic reference to the milky juice of the poppy we find by Theophrastus at the beginning of the third century B. C., when he speaks of it as meconion. Scribonius Largus, in his "Compositiones Medicamentorum," about the year 40 of the present era, describes the method of procuring opium from the capsules of the poppy, and about the year 77 of the same century Dioscorides makes a distinction between the juice of the capsules and the extract of the whole plant. He describes the method of incising the capsules, and refers to adulterations of the drug with the milky juices of other plants so that it is evident that the collection of opium was quite an industry in Asia Minor at that time. Pliny devotes some space to a description of opium and its medicinal use, and the drug is mentioned repeatedly by Celcus in the first century and by numerous other Latin writers. Galen spoke entusiastically of the virtues of opium confections, and the drug was soon so popular in Rome that it fell into the hands of shopkeepers and itinerant quacks.

The introduction of the drug to the natives of the East was through the Arabs, and in the first instance to Persia. Its introduction into India seems to have been connected with the spread of Mohammedanism.

The Arabic physicians used opium very extensively, and even wrote special treatises on some of its preparations. The earliest mention of opium as a product of India is by the traveler Barbosa, in 1511. A Portuguese historian, Pyres, in a letter to Manuel, King of Portugal, in 1516, speaks of the opium of Egypt and Bengal.

Opium is supposed to have been brought to China first by the Arabs, who were known to have traded with the southern parts of the empire as early as the ninth century. Later, says *The Journal of the American Medical Association,* the Chinese began to import the drug in their junks from India. It was not before the second half of the eighteenth century that the importation of opium began to increase rapidly through the hands of the Portuguese, and a little later through the famous East India Company. In 1770 the English established an opium depot in Lark's Bay, south of Macao, and the traffic rapidly increased, so that very soon the Chinese authorities began to complain, and in 1820 an edict was issued forbidding any vessel having opium on board to enter the Canton River. A system of contraband followed, then political friction between England and China, and the so-called Opium War, which culminated in the Treaty of Nanking (1842) by which five ports of China were opened to foreign trade, and in 1858 opium was admitted as a legal article of commerce. By that time the vice of opium-smoking had spread like a plague over the gigantic empire, and became so deeply rooted that, in spite of innumerable edicts and decrees, all efforts to check its growth have been powerless.

Blood and Respiration at Moderate Altitudes.

In recent years our knowledge of the conditions pertaining to life at high altitudes has been greatly enriched by careful scientific investigations carried out in various parts of the world, among others at Pike's Peak, Colorado, by the Anglo-American Expedition of 1911. Among other facts brought out is the observation that the pressures of carbon dioxid and of oxygen in the alveolar air decrease progressively with increase of altitude. At any rate, in persons acclimatized at altitudes of 5,000 to 14,000 feet — the latter corresponding to Pike's Peak — the lowering of the carbon dioxid pressure is in direct proportion to the diminution of the barometric pressure. It has been estimated to amount to about 10 per cent of the sea-level value for each 100 mm. of dimmunition of the barometric figure. The increase in the red corpuscles of the blood at considerable heights is also noticeable. It has become desirable, says *The Journal of the American Medical Association,* to obtain supplementary data on the effect exerted at somewhat lower ranges of altitude, below the 5,000-foot level. These have been gathered by Miss FitzGerald, a competent worker in this field of research. The localities chosen were in the Southern Appalachian chain, among the Blue Ridge Mountains in North Carolina, at altitudes ranging from 2,210 to 3,850 feet. The new facts elicited support, or correspond with, those collected at greater heights. In persons acclimatized at these altitudes the partial pressure of carbon dioxid in the air of the lung is invariably lower than at sea-level, so that the lung ventilation is correspondingly increased. As at higher altitudes, the percentage of hemoglobin in the blood is increased, in accord with the previously published view that for every 100 mm. fall of atmospheric pressure the percentage of hemoglobin is augmented by about 10 per cent of the normal value for men at sea level. The same features apply to women, though greater irregularity obtains in connection with the observations on them.

The Sex of the Insane.

Of approximately every five hundred persons in the United States in 1910, there was one an inmate of an insane asylum. The exact figures expressed in a recent report of the Census Bureau, state that in a typical community of 200,000 persons, equally divided as to sex, 208 of the males and 200 of the females would be found in the insane asylums. In the course of a year, 72 males and 60 females would be admitted to the asylums. In 1880 the total number of inmates in insane asylums in the United States included 20,635 males and 20,307 females. Thirty years later the number of male inmates had increased to 98,695, and the number of female inmates to 80,096. The excess of men among admissions in 1910 indicated a still further increase in the proportion, namely, 128 males to 100 females. An analysis of these admissions as to the specific forms of insanity involved brings to light the interesting fact that if alcoholic psychosis and general paralysis are deducted, the proportion of the sexes is practically the same. The diseases mentioned, says *The Journal of the American*

Medical Association, would seem to be those which, generally, are the result of dissipation. Alcohol and syphilis again established their superiority as man's most dangerous allied foes.

Conference of Charities to Discuss Medical Topics.

Announcement has been made from the headquarters office of the Natioanl Conference of Charities and Corrections of the preliminary program for its forty-second annual meeting at Baltimore, Maryland, May 12th to 19th. The conference will meet under the presidency of Mrs. John M. Glenn of New York, the second woman president it has ever had.

The program contains the names of over fifty leading charity workers and penologists, and it is anticipated the unprecedented social situation of the present year will result in a conference of unique values. The program on "'The Family and the Community" will result in considerable discussion of methods of treating individual cases of poverty, as, for example, in a study of "The Psychology of Co-operation." Prof. Henry R. Seager of Columbia University will give an address on the "Causes and Remedies of Unemployment."

The program of "Health" will be under the chairmanship of Dr. Richard C. Cabot, of Boston. It will include a series of discussions on the social responsibility of the hospital and practical methods of social work in connection with hospitals, the chief speaker being Dr. William H. Welch of Johns Hopkins Hospital, Baltimore. Other subjects will be: "A Pay Clinic for Persons of Moderate Means," "The Distinction Between 'Intensive Cases' and 'Short Service Cases' in Hospital Social Work," and "Social Education of the Physician," the latter subject being treated by Dr. Charles P. Emerson, Dean of the Indiana University Medical School.

In previous years the National Conference has discussed the extent of scientific knowledge of the question of prostitution and the value of current methods of popular education. This year, under the chairmanship of Mrs. Martha P. Falconer, superintendent of the State School for Girls at Darling, Pa., the question will be asked, "How shall the evil be suppressed?" The speakers on this subject include Dr. Katherine Bement Davis, Commissioner of Corrections of the city of New York, and Miss Maude D. Miner, secretary of the Probation and Protective Association of that city.

The discussion of state care of the insane, feeble-minded and epileptic will occur under the chairmanship of Dr. Walter E. Fernald, superintendent of the Massachusetts School for Feeble-Minded at

Waverly. It will incude answers to the question "What is Practicable in the Way of Prevention of Mental Defect and Disease?" and the discussion of "Available Fields for Research and Prevention in Mental Defect." The speakers in this section include Dr. Adolf Meyer of Baltimore, Dr. C. B. Davenport, Cold Spring Harbor, N. Y., Dr. H. H. Goddard of Vineland, N. J., Dr. Martin W. Barr, superintendent of the Pennsylvania School for the Feeble-Minded at Elwyn, and Dr. Walter S. Cornell of Philadelphia.

Other divisions of the program are upon children, corrections, education for social work, the family and the community, public and private charities, and social legislation.

REPORT OF THE HYGIENIC LABORATORIES, OHIO STATE BOARD OF HEALTH, FOR THE MONTH ENDING FEBRUARY 28, 1915.

Diphtheria: Positive 55, negative 168, suspicious 13	236
Tuberculosis: Positive 83, negative 249, suspicious 3	335
Typhoid: Positive 12, negative 38, atypical 4	54
Rabies: Positive 10, negative 3	13
Malaria: Negative 2	2
Miscellaneous 4	4
Total diagnostic	644
Existing water supply 26, proposed water supply 3	29
Typhoid 24, quality 102	126
Columbus Tap 21	21
Miscellaneous 8	8
Sewage 16	16
Total water	200
Total number of examinations classified as above	844

Date reported, March 2, 1915.

REPORTED CASES OF NOTIFIABLE COMMUNICABLE DISEASES, FEBRUARY, 1915.

	Cities.	*Villages and Townships.*	*Total.*
Tuberculosis (all forms)	425	129	554
Pneumonia	323	364	687
Typhoid Fever	105	60	165
Diphtheria	387	168	555
Whooping Cough	192	218	410
Measles	374	793	1,167
Scarlet Fever	376	438	814
Chickenpox	676	432	1,108
Smallpox	142	195	337
Mumps	488	461	949
Gonorrhea	93	78	171
Syphilis	39	24	63
German Measles	26	55	81
Meningitis	11	4	15
Poliomyelitis, Acute Anterior	4	4	8
Ophthalmia Neonatorum	48	8	56
Trachoma	18	12	30
Chancroid	3	....	3
Septic Sore Throat	1	1	2
Continued Fever	...	1	1
Tetanus	...	1	1
Malaria	1	....	1
Totals	3,732	3,446	7,178

COMMUNICABLE DISEASES, FEBRUARY, 1915.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
ADAMS COUNTY—										
Manchester *Vil.*								2		
Peebles *Vil.*								1		
Winchester *Vil.*		2				2				
Jefferson *Tp.*	2	4		2						
Liberty *Tp.*							2			
Scott *Tp.*		1			1					
Wayne *Tp.*								2		
Winchester *Tp.*		2								
ALLEN COUNTY—										
Delphos								5		
Lima	2	7			1	1	5	5		
Lafayette *Vil.*							1			
Spencerville *Vil.*					1	1				1
West Cairo *Vil.*										1
Amanda *Tp.*				1						
Auglaize *Tp.*				1						
Bath *Tp.*	1									
Jackson *Tp.*							2			
Monroe *Tp.*						1				5
Perry *Tp.*				1						
Shawnee *Tp.*	1									
Sugar Creek *Tp.*	2									
ASHLAND COUNTY—										
Ashland					1	1	1			
Hayesville *Vil.*		1			4					
Loudonville *Vil.*									12	
Savannah *Vil.*		1								
Green *Tp.*							1	1		
Hanover *Tp.*									4	
Milton *Tp.*					2					
Perry *Tp.*	1					1				
ASHTABULA COUNTY—										
Ashtabula	3	1		5			8			
Conneaut				1			2		1	
Geneva *Vil.*		2								
North Kingsville *Vil.*				1						
Andover *Tp.*					2					
Austinburg *Tp.*	1	1								
Colebrook *Tp.*		1								
Denmark *Tp.*	1									
Jefferson *Tp.*	1									
Kingsville *Tp.*		1						1		
New Lyme *Tp.*		1				1				
Rome *Tp.*								3		
Saybrook *Tp.*	1						1			
ATHENS COUNTY—										
Athens		1				14				
Buchtel *Vil.*					3	2		2		
Chauncey *Vil.*						5				
Glouster *Vil.*		6				30				
Jacksonville *Vil.*				1			1			
Trimble *Vil.*				1						
Alexander *Tp.*	1	1								
Athens *Tp.*	1	1		1		4				
Dover *Tp.*		1								
Lee *Tp.*						1				
Lodi *Tp.*		6	1							
Trimble *Tp.*	1			2		4				
Troy *Tp.*		2			8					
Waterloo *Tp.*						1				

COMMUNICABLE DISEASES, FEBRUARY, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
AUGLAIZE COUNTY—										
St. Marys							6	2	23	
Wapakoneta	1									
Buckland *Vil.*		1								1
Minster *Vil.*								4		15
New Knoxville *Vil.*		1					8			1
Jackson *Tp.*		1								8
Logan *Tp.*										1
Noble *Tp.*							2			
Pusheta *Tp.*	1	3						4		
St. Marys *Tp.*							9	1	7	
Washington *Tp.*							2			
BELMONT COUNTY—										
Bellaire		4	7	3				5		
Martins Ferry	2		13		2		2			
Barnesville *Vil.*								6		
Brookside *Vil.*					1					
Morristown *Vil.*								1		
St. Clairsville *Vil.*			2	1						
Shadyside *Vil.*		1	3				2			
Colerain *Tp.*	3			8						
Poultney *Tp.*					8					
Somerset *Tp.*					5					
Wayne *Tp.*	1	2			5					
Wheeling *Tp.*			2					4		
York *Tp.*	1	2					5			
BROWN COUNTY—										
Aberdeen *Vil.*						16				22
Fayetteville *Vil.*		4								
Sardinia *Vil.*								1		1
Clark *Tp.*		1					8			
Green *Tp.*		1								
Huntington *Tp.*		1	2							
Perry *Tp.*	1									
Scott *Tp.*			2		1					1
Sterling *Tp.*		4		1						
Union *Tp.*		2								
BUTLER COUNTY—										
Hamilton	5			1	1	2	2		1	
Middletown	1	4		4			1	2		
Oxford *Vil.*	1				1					
Madison *Tp.*										1
St. Clair *Tp.*	1									
Union *Tp.*		2								
Wayne *Tp.*								1		
CARROLL COUNTY—										
Malvern *Vil.*				2				1		
Lee *Tp.*									1	
Perry *Tp.*	1	2								
Union *Tp.*		1								
CHAMPAIGN COUNTY—										
Urbana	1	2	1				1	2		4
North Lewisburg *Vil.*		2								
St. Paris *Vil.*					3					10
Woodstock *Vil.*		1								
Concord *Tp.*										3
Jackson *Tp.*		2			6					9
Johnson *Tp.*	1									
Mad River *Tp.*		2			1					
Union *Tp.*	1	1						8		
Wayne *Tp.*		1								
CLARK COUNTY—										
Springfield	7	1	1	5			1	7	1	24
Enon *Vil.*								17		

COMMUNICABLE DISEASES, FEBRUARY, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.		Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
CLARK COUNTY — Concluded.											
Bethel	*Tp.*		2								
German	*Tp.*		1								
Green	*Tp.*								2		
Madison	*Tp.*						1				
Springfield	*Tp.*	1	1								
CLERMONT COUNTY —											
Batavia	*Vil.*				1						
Bethel	*Vil.*				1			14			
Newtonsville	*Vil.*		1								
Williamsburg	*Vil.*	3									
Batavia	*Tp.*		1								
Goshen	*Tp.*								1		
Miami	*Tp.*		2						4		3
Pierce	*Tp.*										5
Stonelick	*Tp.*		1								
Tate	*Tp.*		1		3			1			
Union	*Tp.*				2						
Wayne	*Tp.*			1							
CLINTON COUNTY—											
Clarksville	*Vil.*				1						
Midland	*Vil.*	1	1					1			1
Wilmington	*Vil.*		2						1		
Jefferson	*Tp.*	1	2					1			
Richland	*Tp.*	1							2		
Union	*Tp.*		2								1
COLUMBIANA COUNTY —											
East Liverpool					1			3	5	16	
Salem		1			2			2	25		
Wellsville				4							
East Palestine	*Vil.*	2	1					1			
Leetonia	*Vil.*				1						
Salineville	*Vil.*		1						9		
Franklin	*Tp.*	1		1							
Liverpool	*Tp.*									1	
Middleton	*Tp.*								1		5
Salem	*Tp.*				1						
Unity	*Tp.*		1								
St. Clair	*Tp.*									14	
COSHOCTON COUNTY —											
Coshocton					1			2			
Plainfield	*Vil.*				1						
Roscoe	*Vil.*	1			2						4
Bedford	*Tp.*		4								
Clark	*Tp.*		2								
Crawford	*Tp.*							15			
Linton	*Tp.*				1						
Mill Creek	*Tp.*										1
New Castle	*Tp.*	1									
Oxford	*Tp.*							1			
Pike	*Tp.*										15
White Eyes	*Tp.*							2			30
CRAWFORD COUNTY —											
Bucyrus		1							3	1	
Galion		2			2						
Bucyrus	*Tp.*		4					1			
Holmes	*Tp.*								2		
Whetstone	*Tp.*							1			
CUYAHOGA COUNTY —											
Cleveland		147	242	10	152	72	54	61	180	2	39
East Cleveland		1			5	1	1	4	19		1
Lakewood					1			3	7		
Berea	*Vil.*	1									
Bratenahl	*Vil.*								3		

COMMUNICABLE DISEASES, FEBRUARY, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
CUYAHOGA COUNTY — Concluded.										
Cleveland Heights *Vil.*								2		2
North Olmsted *Vil.*				5			2			
Rocky River *Vil.*				1			1			
South Newburgh *Vil.*							1			
West Park *Vil.*	2	3		1		1				
Newburgh Heights *Vil.*			1	2						
Brecksville *Tp.*	1			1						
Middleburg *Tp.*	1	2								
Royalton *Tp.*		1					1			
Solon *Tp.*						1				
Strongsville *Tp.*	1	6					1			1
DARKE COUNTY —										
Castine *Vil.*			1							
New Madison *Vil.*					10					
Osgood *Vil.*										8
Union City *Vil.*					3					
Versailles *Vil.*							2			1
Allen *Tp.*										1
Brown *Tp.*				2						
German *Tp.*		2								
Greenville *Tp.*							1			
Monroe *Tp.*		2	2					2		
Patterson *Tp.*							6			
Richland *Tp.*					2					
Wabash *Tp.*							2			
Wayne *Tp.*							2			
DEFIANCE COUNTY —										
Defiance			2	1		32	2			
Hicksville *Vil.*										10
Ney *Vil.*	1	4	1							
Defiance *Tp.*							2			
Farmer *Tp.*		2						6		
Hicksville *Tp.*										6
Mark *Tp.*		1								
Tiffin *Tp.*			1							
DELAWARE COUNTY —										
Delaware	1						2			
Ostrander *Vil.*				1						
Sunbury *Vil.*		2								
Scioto *Tp.*				1			4			
ERIE COUNTY —										
Sandusky	2	1	2				1	22	35	
Huron *Vil.*	1			1						
Vermilion *Vil.*				1						
Huron *Tp.*								1	1	
Margaretta *Tp.*		1							7	
Perkins *Tp.*								1	1	
Vermilion *Tp.*							1			
FAIRFIELD COUNTY —										
Lancaster		1		5			1	2		
Pickerington *Vil.*		2			4					
Pleasantville *Vil.*		1								
Bloom *Tp.*							1			
Clear Creek *Tp.*				1						
Madison *Tp.*		1		4				2		
FAYETTE COUNTY —										
Washington C. H.							3	2		
Bloomingburg *Vil.*		1					1			
Octa *Vil.*		1								
Green *Tp.*								4		
Jasper *Tp.*		4								
Paint *Tp.*									1	

COMMUNICABLE DISEASES, FEBRUARY, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.		Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
FRANKLIN COUNTY—											
Columbus		51		5	11	16	33	27	38		2
Grandview Heights	*Vil.*	1									
Grove City	*Vil.*	1									
Linden Heights	*Vil.*								1		
Reynoldsburg	*Vil.*									1	
Clinton	*Tp.*			1							
Franklin	*Tp.*							3			
Hamilton	*Tp.*							3			
Madison	*Tp.*			1			1				
Marion	*Tp.*	1			1	1		1			
FULTON COUNTY—											
Archbold	*Vil.*							1			
Fayette	*Vil.*		1	1			1				2
Lyons	*Vil.*		5								
Wauseon	*Vil.*							1			
Fulton	*Tp.*								2		
Gorham	*Tp.*										6
Royalton	*Tp.*		3								
GALLIA COUNTY—											
Gallipolis									2		
Crown City	*Vil.*	1									
Addison	*Tp.*			1				2			
Cheshire	*Tp.*		1								
Gallipolis	*Tp.*								2		
Huntington	*Tp.*										1
Raccoon	*Tp.*										4
Walnut	*Tp.*		1								14
GEAUGA COUNTY—											
Chardon	*Vil.*							1			
Middlefield	*Vil.*		2								
Claridon	*Tp.*		1								
Huntsburg	*Tp.*		3					4			
Middlefield	*Tp.*		8								
Newberry	*Tp.*							1			
Parkman	*Tp.*							1			
Troy	*Tp.*							3			
GREENE COUNTY—											
Xenia		4						2			
Yellow Springs	*Vil.*	1	2						1		
Bath	*Tp.*				2						
Caesar Creek	*Tp.*	1	8			5					1
Miami	*Tp.*							1			
New Jasper	*Tp.*	1	4						1		
GUERNSEY COUNTY—											
Cambridge			4	3	4			3			
Fairview	*Vil.*					3					
Old Washington	*Vil.*		1								
Quaker City	*Vil.*	1									
Cambridge	*Tp.*		1								
Jackson	*Tp.*				1						
Londonderry	*Tp.*							1			
Valley	*Tp.*							2			
Wheeling	*Tp.*				2						
HAMILTON COUNTY—											
Cincinnati		105		4	57	23	33	33	66	10	80
Norwood		3			2	6	2	2	46		285
Arlington Heights	*Vil.*										1
Cheviot	*Vil.*				1						
Glendale	*Vil.*										1
Lockland	*Vil.*	2									
Madeira	*Vil.*					4		1			2
Reading	*Vil.*			1							8
Delhi	*Tp.*					10					

COMMUNICABLE DISEASES, FEBRUARY, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
HAMILTON COUNTY — Concluded.										
Green *Tp.*		2						3		5
Whitewater *Tp.*						1				
HANCOCK COUNTY —										
Findlay	8	1				3	8	9	1	
Mt. Cory *Vil.*					8					
Big Lick *Tp.*		1			2		1			
Delaware *Tp.*						2		1		1
Madison *Tp.*							5			
Pleasant *Tp.*						2				
Portage *Tp.*						4				
Union *Tp.*					1					
Washington *Tp.*									1	
HARDIN COUNTY —										
Kenton									6	
Forest *Vil.*		1								
Mt. Victory *Vil.*		1								
Ridgeway *Vil.*									1	
Blanchard *Tp.*									7	
Dudley *Tp.*									1	
Liberty *Tp.*										1
McDonald *Tp.*									27	
Roundhead *Tp.*									4	
Taylor Creek *Tp.*									1	
HARRISON COUNTY —										
Freeport *Vil.*		1		1						
Hopedale *Vil.*				1						
New Athens *Vil.*		1	1							
Cadiz *Tp.*		1								
Green *Tp.*							2			
HENRY COUNTY —										
Deshler *Vil.*			1	1			1			
Hamler *Vil.*						12	2			
Holgate *Vil.*						2				4
Liberty Center *Vil.*						3				
McClure *Vil.*	1									
Napoleon *Vil.*								1		
Flat Rock *Tp.*		1				8				
Harrison *Tp.*	1					8				
Pleasant *Tp.*						24				1
Washington *Tp.*						4		6		
HIGHLAND COUNTY —										
Greenfield *Vil.*		4	1					5		2
Highland *Vil.*		1								
Hillsboro *Vil.*				1						
Leesburg *Vil.*								2		1
Clay *Tp.*		8								
Fairfield *Tp.*		1				1				
Hamer *Tp.*							4			
New Market *Tp.*							1			
Paint *Tp.*		6								
Penn *Tp.*						1				
Union *Tp.*							2			
White Oak *Tp.*										3
HOCKING COUNTY —										
Logan *Vil.*						10	1		7	
Murray *Vil.*	1									
Benton *Tp.*							4			
Falls *Tp.*				1		2				
Salt Creek *Tp.*							4			
Starr *Tp.*	1			3		2		2		
Ward *Tp.*							1			
Washington *Tp.*						1				

COMMUNICABLE DISEASES, FEBRUARY, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.		Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
HOLMES COUNTY—											
Holmesville	*Vil.*					3					
Millersburg	*Vil.*					2					
Paint	*Tp.*				1						
Prairie	*Tp.*		1			4					
Walnut Creek	*Tp.*	1	2								
Washington	*Tp.*		1							1	
HURON COUNTY—											
Bellevue		1						1	1		
Chicago Junction	*Vil.*							1			2
Monroeville	*Vil.*		4					1			
Bronson	*Tp.*						5				
Fairfield	*Tp.*		1				109				
Greenfield	*Tp.*						2				
Greenwich	*Tp.*										1
New Haven	*Tp.*						2				
Norwalk	*Tp.*						1				
Ripley	*Tp.*						6				
JACKSON COUNTY—											
Jackson		1						3			
Wellston					2						
Oak Hill	*Vil.*									1	
Franklin	*Tp.*										4
Jefferson	*Tp.*									6	6
Liberty	*Tp.*				1						
Milton	*Tp.*							1			
JEFFERSON COUNTY—											
Steubenville			2	2	4			1			
Amsterdam	*Vil.*							1			
Brilliant	*Vil.*										1
Empire	*Vil.*				1				1		
Mingo Junction	*Vil.*		1	2	2				1		
Smithfield	*Vil.*			2							
Toronto	*Vil.*		2		1		1	1			
Stratton	*Vil.*								4		
Brush Creek	*Tp.*		4								
Cross Creek	*Tp.*		1						5		
Mt. Pleasant	*Tp.*				2						
Saline	*Tp.*				1						
Smithfield	*Tp.*			1							
Springfield	*Tp.*							2			
Steubenville	*Tp.*				1						
Warren	*Tp.*		1			1		1			1
Wells	*Tp.*								11		
KNOX COUNTY—											
Mt. Vernon					4						
Fredericktown	*Vil.*		1						2		
Berlin	*Tp.*							3		2	
Hilliar	*Tp.*							1			
Milford	*Tp.*							7			
Union	*Tp.*		2						1		
LAKE COUNTY—											
Painesville									1		
Fairport Harbor	*Vil.*			1						1	
Grand River	*Vil.*								1		
Willoughby	*Tp.*							2			
LAWRENCE COUNTY—											
Ironton		1									
Chesapeake	*Vil.*		5								
Coal Grove	*Vil.*	1	4	4				4			
Hanging Rock	*Vil.*							2			
South Point	*Vil.*		2								
Decatur	*Tp.*		1								2
Fayette	*Tp.*		2			8					

COMMUNICABLE DISEASES, FEBRUARY, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
LAWRENCE COUNTY—Concluded.										
Mason Tp.	2									20
Perry Tp.		1								
Rome Tp.							5			
Washington Tp.				2		2				41
Windsor Tp.										4
LICKING COUNTY—										
Newark	5			2		2	2	9		
Granville Vil.										1
Kirkersville Vil.					1					
Utica Vil.	1									
Bennington Tp.							6			
Burlington Tp.						1	2			
Fallsburg Tp.										1
Granville Tp.		1								
Madison Tp.	1							9		
Newark Tp.	1									
Perry Tp.							1			
Union Tp.						6				
LOGAN COUNTY—										
Bellefontaine				1			2	16		
Belle Center Vil.	1						1			
DeGraff Vil.									1	
Huntsville Vil.		1								
Rushsylvania Vil.								2		
West Liberty Vil.	1									
Liberty Tp.		2								
McArthur Tp.		1						5		
Pleasant Tp.								15		
Richland Tp.								6		
Rush Creek Tp.								1	1	
Washington Tp.								1		
Zane Tp.		1					5	8		2
LORAIN COUNTY—										
Elyria	3				10	23	1	4		
Lorain	3	5	1	3			1	9		
Grafton Vil.								10		
Oberlin Vil.	1									
Amherst Tp.	1			1						
Carlisle Tp.						5		2		
Columbia Tp.		2			2	1	1			
Eaton Tp.						2		3		
Elyria Tp.						1		2		
Huntington Tp.					1					
Ridgeville Tp.		3		2		1				
LUCAS COUNTY—										
Toledo	4	1	1	23	18	50	20	67	8	1
Adams Tp.				2			4			
Monclova Tp.						1				
Springfield Tp.	1									1
Washington Tp.			1	2			2	4		
MADISON COUNTY—										
London							2			
South Solon Vil.						2				
Darby Tp.							2			
Paint Tp.				1						
Pike Tp.		1								
Union Tp.							1			
MAHONING COUNTY—										
Youngstown	21	25	6	13	2	5	12	11		14
East Youngstown Vil.	2	10		1		1	5	5		4
Lowellville Vil.							1			
Sebring Vil.		1		1			1			
Struthers Vil.	2	1				1				

COMMUNICABLE DISEASES, FEBRUARY, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
MAHONING COUNTY — Concluded.										
Austintown *Tp.*		2								
Beaver *Tp.*										2
Berlin *Tp.*		1						4		10
Boardman *Tp.*		1		1				10		20
Coitsville *Tp.*	1									
Ellsworth *Tp.*										2
Green *Tp.*				1						
Poland *Tp.*	1									
MARION COUNTY —										
Marion				4				4		
Larue *Vil.*					2			2		
Morral *Vil.*					1					
Waldo *Vil.*										1
Big Island *Tp.*									4	
Bowling Green *Tp.*					3					
Grand *Tp.*						3				
Grand Prairie *Tp.*								8		
Marion *Tp.*								1		
Montgomery *Tp.*				1	7				1	
Salt Rock *Tp.*						2			1	
MEDINA COUNTY —										
Lodi *Vil.*									1	
Medina *Vil.*							1	3	3	
Brunswick *Tp.*		1					1			
Harrisville *Tp.*				1						
Hinckley *Tp.*		2								
Litchfield *Tp.*								2		
Liverpool *Tp.*								4		
Wadsworth *Tp.*							1			
MEIGS COUNTY —										
Middleport *Vil.*						1		3		
Pomeroy *Vil.*	1									
Rutland *Vil.*								5		
Bedford *Tp.*						2				
Chester *Tp.*						10				
Columbia *Tp.*						1				
Rutland *Tp.*				1						
Sutton *Tp.*								3		
MERCER COUNTY —										
Celina *Vil.*				2						
Coldwater *Vil.*				6						
Fort Recovery *Vil.*		2								
Mendon *Vil.*		1								
Rockford *Vil.*					2	10		12		
St. Henry *Vil.*		1								
Center *Tp.*							1			
Granville *Tp.*		2								
Marion *Tp.*							15			80
Union *Tp.*					20					
MIAMI COUNTY —										
Piqua	8	8		1	1		5			1
Troy				1						
Bradford *Vil.*				6						2
Covington *Vil.*								1		
West Milton *Vil.*	1				3		6			
Newberry *Tp.*					1		3			
Spring Creek *Tp.*							1			
Washingon *Tp.*							1			
MONROE COUNTY —										
Antioch *Vil.*							1			
Woodsfield *Vil.*				1		2				
Franklin *Tp.*			1							
Jackson *Tp.*							2			

COMMUNICABLE DISEASES, FEBRUARY, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
MONROE COUNTY — Concluded.										
Sunsbury Tp.							3			
Washington Tp.							1			
MONTGOMERY COUNTY —										
Dayton	23		8	17	26	108	50	47		22
Brookville Vil.					1					
Centerville Vil.							2			
Farmersville Vil.	1									
Germantown Vil.				2						
Miamisburg Vil.				1			2			
New Lebanon Vil.						1				
West Carrollton Vil.								2		
Jackson Tp.	2						4			
Jefferson Tp.	1	1				11	1			
Madison Tp.				4						
Mad River Tp.							2			
Randolph Tp.							2			
Washington Tp.						8				
Harrison Tp.	1			2			1			
MORGAN COUNTY —										
Bristol Tp.										2
Center Tp.										7
Penn Tp.	2	1								
MORROW COUNTY —										
Mt. Gilead Vil.	1	2								
Sparta Vil.	1	4								
Gilead Tp.	1									
Harmony Tp.		1								
North Bloomfield Tp.				2			1			
MUSKINGUM COUNTY —										
Zanesville		8	24	1	1		5	4		4
Cannelville Vil.		1	1		12					
South Zanesville Vil.		1					1			
Cass Tp.						1				
Highland Tp.								4		
Jefferson Tp.	1									
Muskingum Tp.			1							
Union Tp.							1			
NOBLE COUNTY —										
Elk Tp.							1			
Enoch Tp.								8		
Jackson Tp.								1		1
Noble Tp.	1							1		
OTTAWA COUNTY —										
Genoa Vil.		1								
Marblehead Vil.								1		
Port Clinton Vil.							1			
Benton Tp.							4			2
Danbury Tp.					3			2		
Erie Tp.		1						1		3
PAULDING COUNTY —										
Melrose Vil.	2									
Oakwood Vil.										2
Paulding Vil.				1		5			3	
Brown Tp.								2	1	
Emerald Tp.									2	
Jackson Tp.									5	
Paulding Tp.									2	
Washington Tp.									10	
PERRY COUNTY —										
Corning Vil.								2		
Crooksville Vil.		3						1		
Hemlock Vil.							1	20		
Junction City Vil.	1	1		1			4			

COMMUNICABLE DISEASES, FEBRUARY, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.		Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
PERRY COUNTY—Concluded.											
New Lexington	*Vil.*	....	....	1	....	....	....	....	....	....	....
New Straitsville	*Vil.*	....	1	....	....	....	....	....	....	....	....
Rendville	*Vil.*	....	4	2	....	....	....	....	2	....	....
Shawnee	*Vil.*	1	1	....	4	....	1	....	....	....	....
Coal	*Tp.*	....	1	....	....	....	....	....	....	....	....
Hopewell	*Tp.*	....	....	....	....	....	....	....	1	....	1
Jackson	*Tp.*	1	4	....	1	....	....	2	....	....	....
Monroe	*Tp.*	....	....	....	....	....	....	1	....	....	....
Pleasant	*Tp.*	....	....	....	....	....	9	1	....	....	....
PICKAWAY COUNTY—											
Washington	*Tp.*	....	....	....	....	....	....	8	....	....	1
Wayne	*Tp.*	....	....	....	....	....	....	2	....	....	....
PIKE COUNTY—											
Beaver	*Tp.*	1	....	1	....	....	....	....	....	....	....
Camp Creek	*Tp.*	2	....	....	....	....	....	....	....	....	....
Mifflin	*Tp.*	....	....	....	1	....	....	....	....	....	....
Pebble	*Tp.*	....	....	....	....	....	....	....	....	....	2
Perry	*Tp.*	....	3	....	....	....	....	....	....	....	....
PORTAGE COUNTY—											
Hiram	*Vil.*	....	....	....	....	....	....	....	15	....	....
Kent	*Vil.*	....	....	....	1	....	....	....	....	....	....
Mantua	*Vil.*	....	....	....	....	....	....	2	....	....	....
Aurora	*Tp.*	....	1	....	....	....	....	....	....	....	....
Deerfield	*Tp.*	....	....	....	....	....	....	....	....	....	1
Edinburg	*Tp.*	....	....	....	....	....	....	....	....	....	4
Hiram	*Tp.*	....	....	....	....	....	....	....	9	....	....
Mantua	*Tp.*	....	....	....	....	....	....	....	1	....	....
Nelson	*Tp.*	....	....	....	....	....	2	....	....	....	....
Palmyra	*Tp.*	....	....	....	....	....	....	....	1	....	....
Randolph	*Tp.*	....	....	....	....	....	1	1	....	....	....
Ravenna	*Tp.*	....	....	....	2	....	....	....	....	....	....
Streetsboro	*Tp.*	....	....	....	1	....	....	....	....	....	....
PREBLE COUNTY—											
Eaton	*Vil.*	....	1	....	1	5	2	....	....	....	....
Lewisburg	*Vil.*	....	....	1	....	....	....	....	....	....	....
Dixon	*Tp.*	....	....	....	....	3	21	....	2	....	5
Israel	*Tp.*	....	1	....	....	1	....	....	....	....	....
Jackson	*Tp.*	....	1	....	....	....	4	....	....	....	....
Washington	*Tp.*	....	....	....	1	....	....	....	....	....	....
PUTNAM COUNTY—											
Belmore	*Vil.*	1	....	....	....	....	....	....	....	....	....
Columbus Grove	*Vil.*	....	1	....	1	....	38	....	....	....	....
Continental	*Vil.*	....	....	....	....	....	8	....	....	....	....
Glandorf	*Vil.*	....	1	....	....	....	2	....	....	....	....
Leipsic	*Vil.*	....	....	....	1	....	....	5	....	....	....
Pandora	*Vil.*	....	4	....	....	1	....	....	....	....	....
Jennings	*Tp.*	....	....	....	....	....	2	2	....	....	....
Palmer	*Tp.*	....	....	....	....	....	10	....	....	....	....
Pleasant	*Tp.*	2	3	....	....	....	14	....	....	....	....
Riley	*Tp.*	....	5	....	....	1	....	....	....	....	....
Sugar Creek	*Tp.*	1	....	....	....	....	....	3	....	....	....
Van Buren	*Tp.*	....	....	....	....	....	....	2	....	....	....
RICHLAND COUNTY—											
Mansfield	....	2	....	....	2	....	2	6	3	....	....
Shiloh	*Vil.*	....	....	....	....	....	....	....	....	....	1
Blooming Grove	*Tp.*	....	....	....	....	....	....	....	....	....	3
Franklin	*Tp.*	....	....	....	2	....	....	....	....	....	....
Madison	*Tp.*	....	1	....	1	....	....	3	....	....	....
Sandusky	*Tp.*	....	....	....	....	....	....	4	....	....	....
Troy	*Tp.*	1	....	....	....	....	....	....	....	....	....
Weller	*Tp.*	....	....	....	1	....	....	....	....	....	....

COMMUNICABLE DISEASES, FEBRUARY, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
ROSS COUNTY—										
Chillicothe				1						
Frankfort *Vil.*								1		
South Salem *Vil.*	1	1								2
Colerain *Tp.*			1							
Concord *Tp.*							1	1		
Green *Tp.*		2			2					
Harrison *Tp.*	1			1			1	1		
Liberty *Tp.*				2						
SANDUSKY COUNTY—										
Fremont			1					2		
Clyde *Vil.*							1			
Bellville *Tp.*							1	2		
Madison *Tp.*	1	6					2			
Riley *Tp.*							8			
Sandusky *Tp.*			1				2			
Scott *Tp.*							1			
Washington *Tp.*							4			
SCIOTO COUNTY—										
Portsmouth	1		8	7			2	3		
Rarden *Vil.*					6					
South Webster *Vil.*							1			
Green *Tp.*	1									
Valley *Tp.*				1						
Washington *Tp.*								5		
SENECA COUNTY—										
Fostoria	1			4			2	1	10	
Tiffin								1		
Bloomville *Vil.*	1	1								
Adams *Tp.*	1									
Bloom *Tp.*	1									
Jackson *Tp.*							1			
Liberty *Tp.*								1		
Loudon *Tp.*									1	
Pleasant *Tp.*								11		
Thompson *Tp.*							2			
SHELBY COUNTY—										
Kettlersville *Vil.*		1								
Loramie *Tp.*							22			
Van Buren *Tp.*		1								
STARK COUNTY—										
Canton	2		2	5	10	1	58	12	22	5
Massillon	3			1			1			
Canal Fulton *Vil.*							2			
Minerva *Vil.*								3		
Navarre *Vil.*										2
New Berlin *Vil.*	1									
Osnaburg *Vil.*							1			
Canton *Tp.*			1	2			3		7	
Jackson *Tp.*							1			
Osnaburg *Tp.*							1		1	
Paris *Tp.*							1			
Plain *Tp.*							1			
Tuscarawas *Tp.*						50				
SUMMIT COUNTY—										
Akron	8	1	3	23	1		18	22	1	
Barberton							1			
Cuyahoga Falls *Vil.*							1			
Kenmore *Vil.*	1		1	1						
Mogadore *Vil.*	1									
Western Star *Vil.*	1									
Franklin *Tp.*							1			
Green *Tp.*		1					1	1		
Norton *Tp.*							1			

COMMUNICABLE DISEASES, FEBRUARY, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
SUMMIT COUNTY — Concluded.										
Richfield Tp.						1				
Talmadge Tp.		1								
TRUMBULL COUNTY —										
Niles		5								
Warren			2				2	4		2
Cortland Vil.										2
Mineral Ridge Vil.	1									
Newton Falls Vil.	1									
Orangeville Vil.					2					4
Braceville Tp.		2								
Hubbard Tp.	1	3								
Johnston Tp.		1					2			
Liberty Tp.	1									
Lordstown Tp.								6		
Vienna Tp.					5					
Weathersfield Tp.							1			
TUSCARAWAS COUNTY —										
Canal Dover				3			4			
New Philadelphia		2		1			1			
Newcomerstown Vil.				1			4			
Port Washington Vil.		2								
Strasburg Vil.	1									
Uhrichsville Vil.			1							
Auburn Tp.		2					2			
Fairfield Tp.						2				
Franklin Tp.							3			1
Goshen Tp.							2			
Lawrence Tp.	1							3		
Mill Tp.	1									
Oxford Tp.							3			
Salem Tp.		2								
Warren Tp.							6			15
Wayne Tp.									4	1
York Tp.							3			
UNION COUNTY —										
Milford Center Vil.				1						
Jackson Tp.							3			
Jerome Tp.		1								
Taylor Tp.	1									
Union Tp.							3			
Washington Tp.							1			
VAN WERT COUNTY —										
Van Wert				1		6	1			
Convoy Vil.						1				
Ohio City Vil.	1	1	1				1			
Venedocia Vil.						25		1		
Wren Vil.							1			
Harrison Tp.						2				
Hoaglin Tp.						3				
Jackson Tp.	1	1								
Jennings Tp.						6				
Liberty Tp.		1				23	2			
Ridge Tp.						6	3			
Tully Tp.						13				
Washington Tp.							1			
Willshire Tp.						6				
York Tp.						25				
VINTON COUNTY —										
Hamden Vil.										1
McArthur Vil.							1			
Knox Tp.		1								
Swan Tp.				2						
Wilkesville Tp.							1			

COMMUNICABLE DISEASES, FEBRUARY, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.		Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
WARREN COUNTY—											
Harveysburg	*Vil.*		1				1				
South Lebanon	*Vil.*				1						
Waynesville	*Vil.*						25		5		1
Clear Creek	*Tp.*						1				1
Hamilton	*Tp.*				1						
Harlan	*Tp.*										1
Massie	*Tp.*						7				
Turtle Creek	*Tp.*		1				1	1	20		1
Washington	*Tp.*		1					2			
Wayne	*Tp.*						42				2
WASHINGTON COUNTY—											
Marietta											4
Belpre	*Vil.*			1							
Beverly	*Vil.*					1					
Grandview	*Tp.*							4			
Watertown	*Tp.*								1		
Wesley	*Tp.*				2						
WAYNE COUNTY—											
Bloomington	*Vil.*							1			
Creston	*Vil.*			1							
Dalton	*Vil.*								5		
Fredericksburg	*Vil.*					1					
Orrville	*Vil.*									1	
Smithville	*Vil.*							5			
West Salem	*Vil.*			1							
Baughman	*Tp.*		3								
Chester	*Tp.*		1							1	
Chippewa	*Tp.*						1				
Clinton	*Tp.*								1		
Congress	*Tp.*									4	
East Union	*Tp.*							1			
Paint	*Tp.*				3						
Sugar Creek	*Tp.*	1					81				
WILLIAMS COUNTY—											
Alvordton	*Vil.*	1									
Bryan	*Vil.*							1			
Pioneer	*Vil.*		1								
West Unity	*Vil.*						40			1	
Brady	*Tp.*						2				
Bridgewater	*Tp.*					11			6		
Mill Creek	*Tp.*				1						
WOOD COUNTY—											
Bowling Green							1		1	4	
Hoytsville	*Vil.*		1			4					1
Prairie Depot	*Vil.*		1						3		
Walbridge	*Vil.*						1				
Bloom	*Tp.*		1								
Henry	*Tp.*						1				1
Jackson	*Tp.*				1						
Montgomery	*Tp.*									1	
Perry	*Tp.*									1	
Perrysburg	*Tp.*					2					
Portage	*Tp.*									1	
Ross	*Tp.*	1		1		6					
Troy	*Tp.*										10
Webster	*Tp.*							1			
WYANDOT COUNTY—											
Carey	*Vil.*				3						
Nevada	*Vil.*									7	
Sycamore	*Vil.*				1						
Upper Sandusky	*Vil.*		1	2					3		
Crane	*Tp.*			1							

COMMUNICABLE DISEASES, FEBRUARY, 1915—Concluded.

This table records cases of specified diseases reported to the State Board of Health for the month of February, 1915.

Health District.		Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
WYANDOTTE COUNTY—Concluded.										
Eden *Tp.*							1	8	17	
Jackson *Tp.*							1		2	
Mifflin *Tp.*				1						
Pitt *Tp.*								1		
Richland *Tp.*				1					1	
Sycamore *Tp.*				1						

NUMBER AND DISTRIBUTION BY COUNTIES OF REPORTED CASES OF COMMUNICABLE DISEASES NOT INCLUDED IN THE GENERAL TABLE, FEBRUARY, 1915.

County.	Gonorrhea.	Syphilis.	German Measles.	Epidemic Cerebro Spinal Meningitis.	Acute Anterior Poliomyelitis.	Ophthalmia Neonatorum.	Trachoma.	Other Notifiable Diseases.
Adams	1							
Allen	4				1	1		
Ashland	4	1						
Ashtabula		1	3	1				
Athens	8	1	9					
Auglaize	2	1						
Belmont	4					1		
Butler	1							*a*2
Carroll	1							
Champaign							1	
Clark	8	8				1	8	
Clermont	2	1						
Columbiana			17			1		
Cuyahoga	2	4		4	8	84	4	
Darke		1	1					
Defiance			3					
Delaware						1		
Fairfield	1							
Fayette	2							
Franklin	5	8		4		4	5	
Geauga	1							
Greene	3	1	1	1				
Hamilton	8	1	21				8	
Hancock				1		1		
Hardin	8							
Henry	1	1						
Highland	1	2						
Holmes	2							
Jackson						1		
Jefferson	4	8	1			1		*b*1
Licking	6					1		*c*1
Logan	2							
Lucas	53	14				8		*d*8
Madison	2							
Mahoning	11	7	7			3	9	*e*1
Medina	1	1						
Meigs			1					
Mercer						1		
Miami	8	8						
Montgomery			2	1				
Morgan	1							
Muskingum	8		2	2				
Noble							1	
Ottawa	1		1					
Paulding		2			1			
Perry	8	2	1				1	
Pickaway					1			
Portage	1							
Preble	2							
Richland		1						
Sandusky	8							
Scioto						1		
Seneca	2							
Stark	2	2	1			1	1	
Summit	8	2		1	1		1	
Trumbull	8	1						
Tuscarawas	9		10					
Vinton	1							
Warren	2	8					1	
Washington	1							
Wayne	2							
Williams	1				1			
Wyandot		1						

*a*Malaria 1. Septic Sore Throat 1. *b*Septic Sore Throat. *c*Tetanus. *d*Chancroids. *e*Continued Fever.

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*Sources of Public Water Supplies of Ohio, Preliminary Reports.

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The Necessity of Plumbing Inspection in Rural Districts, by Wm. C. Groeniger. 9 p. Reprint Monthly Bulletin, October 1912.

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CERTAIN FOODS AND THEIR RELATION TO DISEASE.

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General Considerations. Food may be defined as material, taken into the body in the ordinary process of eating, which contains the elements necessary for the growth and repair of body tissues, and for the furnishing of the heat and energy necessary to life. Foods may be classified in a great variety of ways. For the purpose of this discussion they may be classified as follows:

1. Nitrogenous foods or proteids, such as lean meat, egg white, casein of milk. Peas and beans are also rich in proteids. This class of foods is essential for building up new tissues and repairing old.
2. Starchy or carbohydrate foods, such as sugars, cereals, vegetables.
3. Fats and oils, such as butter, olive oil, nuts. Carbohydrates, fats, and oils serve chiefly as fuel in the production of heat and energy in the body.
4. Condiments, such as spices, coffee, vinegar.
5. Mineral matter, mostly common salt and lime compounds.

These last two classes serve mainly to improve the flavor of foods and to aid in digestion, mineral matter being necessary also to make the bones hard.

Nitrogenous foods are the ones most frequently concerned in cases of food poisonings, carbohydrates only rarely, and fats practically not at all.

The quantity of food required to maintain health and energy varies with the climate and season, occupation, exercise, state of health, age, sex and weight.

It is very essential that a person receive not merely sufficient food, but a sufficient amount of the right kind of food, not only as to the right proportion of the above nutritive ingredients, but as to the ease and completeness of digestion of the food selected, and as to variety. In the past it has been commonly considered that the standard diet should contain relatively one part of proteids, to two-thirds parts of fat, to three and one-sixth parts carbohydrates, and one-fourth part mineral matter. Recent work by Chittenden proves, however, that only one-half this amount of proteid is necessary, the larger amount needlessly burdening the system with waste material and increasing the cost of living.

Foods may cause illness from a variety of conditions:

1. A substance, naturally poisonous, may be mistaken for a food substance and eaten, as the mushroom Amanita phalloides.

2. Both plants and animals may feed on substances which are not harmful to them, but which may seriously affect man, as birds that eat mountain laurel, and fish—cluppea thrissa and venenosa—that feed on medusae, corals, and other decomposing substances.

3. Flesh of some animals is poisonous during the periods of physiological activity of certain glands. (In Japan twelve species of tetrodon furnish poisonous flesh during spawning season.)

4. Fish may contain poisonous glands only, the meat being harmless after these glands are removed. (Dragon weaver — Trachinous draco — of German lakes, possesses poison glands connected with barbed fins.)

5. Foods may become infected with poison-producing parasitic fungi. (The fungus, claviceps purpurea, grows in rye and other grains, producing ergot, the disease resulting from its consumption by man being known as ergotism.)

6. Foods may convey foreign or accidental poisons by the addition of harmful adulterants, or mineral poisons.

7. Foods may contain animal parasites, as trichinae and tape worm larvae.

8. Foods may become infected with specific pathogenic bacteria and hence serve as carriers of infection, as B. typhosus on oysters and celery.

9. Animals may be afflicted with a specific disease, and this may be transmitted to man in meat or milk, as tuberculosis.

10. Foods may become contaminated with saprophytic bacteria which by their growth elaborate chemical poisons, either before or after the food has been eaten, as toxine of B. botulinus, ptomain poisoning, para typhoid fever. This class furnishes the most instances of true food poisonings.

11. Foods may not be poisonous in themselves, but may be harmful to persons who cannot digest them or lack the mechanism by which they may be assimilated — eggs being poisonous to some persons. This phenomenon resembles anaphylaxis.

Classes 7, 8, 9, and 10, especially 10, will furnish the basis for this paper, as these deal directly or indirectly with bacterial or parasitic infections of articles of food. These will now be taken up in their order, giving in detail the diseases resulting, prophylactic measures where possible, and other information of interest in health work.

DISEASES CAUSED BY ANIMAL PARASITES.

I. *Trichinosis,* caused by the parasite Trichinella spiralis. This is a round worm that passes its entire life cycle in the body of man, rat or hog. Mice, guinea pigs, rabbits, cats and dogs are also susceptible.

The larvae of this worm are imbedded in the muscles of the animal affected. When such meat is eaten the capsules surrounding the larvae are dissolved by the gastric juice and the parasites liberated. In the intestines the parasites grow, reaching maturity in a few days, when they can be seen as fine thread-like worms. Each female parasite produces as many as 500 eggs in the intestines. These eggs migrate through the walls of the intestines, enter the blood stream, and are carried to the muscles. They are found in the muscles 7 to 9 days after the trichinous meat was eaten.

Rosenau says the "normal host is the rat, which gets infected around slaughter houses and butcher shops. Hogs get the disease by eating rats, through feces, or directly from infected offal. Man gets the infection by eating trichinous pork."

The symptoms of the disease are first, gastro-intestinal and second, general infection — fever, intense pain and edema.

II. *Tapeworm,* caused by any one of three parasites:

a. Taenia solium, producing the pork or measly tape worm.

This parasite passes the larval stage of its life in the flesh of pork, these encysted larvae being known as bladder worms or Cysticercus cellulosae, or pork measles. Man eats these larvae in pork, and they develop into the adult tapeworm. Hogs become infected from eating human feces containing the eggs or from food and water so contaminated. Man may also infect himself, especially his eyes, with these eggs, the development of the Cysticerci in eye and brain being very serious. The adult tapeworm occurs only in man, and its head has a double row of hooks with which it maintains its hold on the mucous membrane. The principal danger of this infection lies in the ease with which cysticercus formation can take place.

b. Taenia saginata, producing beef tapeworm, occurs only in cattle and man. It is not dangerous, though larger than Taenia solium. The adult worm is found only in man, the larvae are found inbedded in beef, the encysted larva being known as Cysticercus bovis. Man becomes infected by eating underdone beef; cattle, through eating the eggs found in human feces, which contaminate their food and water. The adult worm is very hard to expel, even though it is not fastened by hooks.

Trichinosis and pork and beef tapeworm infections can best be prevented by thorough cooking of all meat eaten. This is an absolute prevention. Inspection of meat for the presence of these organisms is unsatisfactory. Other prophylactic measures recommended are:

1. Rat-proofing of slaughter houses.
2. Proper disposal of human feces, to insure the non-contamination of water supplies and to prevent cattle and hogs from coming in contact with them, directly or indirectly.
3. Killing of all hogs and cattle known to be infected.

c. Diborthriocephalus latus, or fish tapeworm. The cysticercus or larval stage is found in flesh of various fresh water fish. When eaten the adult tapeworm develops in man's intestines, severe anemia resulting. The eggs are discharged in the feces and fish living in water contaminated with such waste material becomes infected. The adult tapeworm is armed with hooks by which it fastens itself to the intestines.

Prophylaxis consists in prevention of contamination of fresh water streams with human feces, and in the thorough cooking of all fish meat.

FOODS AS CARRIERS OF SPECIFIC PATHOGENIC BACTERIA.

In this group there will be included only those foods that may be contaminated with specific human pathogenic bacteria, directly or indirectly, the consumption of which food gives rise to the specific disease.

1. *Oysters.* Oysters have been repeatedly suspected of transmitting typhoid fever. They may become contaminated by being grown or kept in water which receives sewage pollution, B. typhosus having been isolated many times from the surface of the oyster inside the shell, under such conditions. However, in actual epidemics of typhoid fever traced to oysters, it has rarely been possible to furnish bacteriological proof that the oyster carried the infection, because by the time the disease appears, that particular stock of oysters has been sold and no more material is available. There is no doubt, however, that oysters are capable of carrying typhoid infection, and that they do so frequently. Oysters that are to be used as food should never be collected from water that is itself bacteriologically unfit to drink.

Cholera may also be transmitted by oysters.

2. *Celery and Vegetables.* These may be grown in soil fertilized with fecal material of human origin containing typhoid or cholera organisms. In this case, the vegetable may, unless cooked, convey this infection to human beings, or the substance may be free from infection when taken from the garden and be washed with polluted water. If, afterwards, it is eaten raw, typhoid fever or cholera may result.

3. *Milk.* Because milk is the only standard article of diet obtained from animal sources that is consumed in the raw state, and because it is rich in food on which pathogenic bacteria may thrive, it is frequently the cause of epidemics of typhoid fever, diphtheria and possibly scarlet fever. The milk may become contaminated (1) by the use of vessels washed in water containing B. typhosus; (2) from dilution with such water; (3) from flies that come in contact with typhoid and diphtheria patients or their discharges; (4) from hands, person, or clothing of those handling the milk who are themselves sick or convalescent from typhoid fever, diphtheria, or scarlet fever or who have been nursing or caring for such patients; or (5) from unconscious carriers of typhoid or diphtheria.

Some of the characteristics of such epidemics are:

1. Sudden onset of epidemic, rapid increase, gradual decline.
2. Sharpness of curve dependent on amount and virulence of the infection of the milk.
3. Length of epidemic varies with incubation period of disease and length of time milk remains infected.
4. Epidemic follows affected milk routes exclusively at first.
5. Special incidence of disease among milk drinkers.

The only absolute prevention of such epidemics lies in the pasteurization of all milk supplies. In addition a close watch should be kept over the sanitary conditions around the dairy, the methods of handling the milk and the health of the people concerned in its collection and distribution.

ILLNESS CAUSED BY EATING THE FLESH OR MILK OF ANIMALS AFFLICTED WITH SOME SPECIFIC DISEASE.

Living pathogenic bacteria in diseased meat and fish may be taken into the stomach in limited numbers and not cause disease. The digestive juices of the stomach and intestines and the normal intestinal bacterial flora ordinarily protect the individual. It is only when conditions are such as to favor the extensive multiplication of the invading organisms that they are likely to produce illness. Such meat is usually more dangerous if allowed to come in contact with a cut or sore, for then the living bacteria in the meat enter the blood stream directly. Thoroughly cooked meat never contains living organisms.

Some fish, notably certain species of sturgeon found in Russia and Germany, become diseased and furnish meat that causes sickness when eaten. In this country, however, cattle and swine furnish the most instances of diseases of this class.

The regulations governing the meat inspection of the United

States Department of Agriculture, Bureau of Animal Industry, give quite a long list of diseases which, if present in an animal, render the meat unfit for consumption, such as pyemia and septicemia, vaccine animals, rabies, tetanus, anthrax, hog cholera, generalized tuberculosis, tape worm cysts, advanced mange, generalized actinomycosis and a few other less common diseases. Instances are on record where such meat has been eaten with no bad results, but it is not advisable to use it and such meat cannot be sold in this country in public market. In many European countries such meat is sterilized by steam and sold, as such, in special markets, at reduced prices.

Tuberculosis. There is much difference of opinion as to the possibility of contracting tuberculosis from eating meat from tuberculous animals. Some advocate condemning the entire carcass on the slightest evidence of the disease, while others maintain that the entire animal may be used as food without danger. While there is very little evidence of value that the disease is transmitted through such meat, whatever danger there may be is disposed of by thorough cooking. Since raw meat or meat cooked "rare" is frequently eaten, it is best to be on the safe side, to see that such meat is free from infective organisms.

The U. S. Bureau of Animal Industry rules that meat should not be used for food if it contains tubercle bacilli, if there is a reasonable possibility that it contains tubercle bacilli, or if it is impregnated with toxic substances of tuberculosis or associated septic infections. If, however, the lesions are strictly localized and not numerous, if there is no evidence that the bacilli are distributed through the blood, or by other means, to the muscles and other edible portions, and if the animal is well nourished, the flesh is regarded as wholesome. It has been proven that milk of cows afflicted with tuberculosis in any part of the body, and with no local lesion of the udder whatever, may contain the tubercle bacillus. This may be due in part to surface contamination of the flanks and udder with the feces of the animal. There is much evidence to show that tuberculosis may be contracted from milk, but in the large majority of cases, the bacilli perish or are discharged before entering human tissues. Many authorities are of the opinion that man is subject to two kinds of tuberculosis, (1) the pulmonary form, rare in children, due to the human tubercle bacillus; and (2) other forms, such as abdominal tuberculosis, that of joints, and tubercuolus meningitis, rare in adults, and due to the bovine tubercle bacillus.

It is apparent, from all available tables of specific cases, that bovine tuberculosis decreases in importance with the increasing age of the individual, and that the bovine type is far less important than the human type in its effect on man.

Besides tuberculosis, there are numerous cattle diseases which may affect man through milk:

1. Foot and mouth disease. It is said that in mild cases, the milk is unchanged, but in severe cases it may become abnormal in appearance and composition and cause serious illness in man.

2. Anthrax and Rabies. Milk from such animals, as well as their flesh, should never be eaten, or allowed to come in contact with cuts or sores. Such milk has been found to carry the specific organisms or virus of those diseases.

3. Actinomycosis. There is little evidence to show that this disease is ever transmitted through milk, but such milk should be avoided, especially if the udder is affected.

4. Specific Enteritis. In this disease, caused by the hog-cholera group of bacteria, milk may be infected through contamination with feces during milking. Such milk may cause sickness.

5. Garget, Mastitis, Mammitis. When the udder is inflamed, partly or entirely, the milk may be so changed as to be wholly unfit for use, or it may be normal in appearance. In either case the milk may contain many streptocacci, B. coli, or sometimes stphylococcus pyogenes aureus and albus.

Epidemic diarrhoea may result from drinking such milk, but the commonest and most characteristic effects of its use are seen in outbreaks of septic sore throat, which may be very severe and extensive. Notable epidemics of this kind have occurred in this country in Boston, May, 1911, Chicago, winter of 1911-1912, Baltimore, latter part of 1912. In Boston there were about 2,000 cases and 48 deaths.

6. Milk sickness. Slows or trembles is a cattle disease found in the central part of the United States. Its cause is not definitely known, though Jordan and Harris found a bacillus associated with the disease, which they named B. lactis morbi. Milk sickness is an acute non febrile disease due to eating milk, milk-products, or flesh of animals afflicted with this disease.

ILLNESS CAUSED BY POISONS GENERATED IN FOOD AS A RESULT OF BACTERIAL GROWTH.

General Considerations. Under this heading are included the majority of cases of food poisoning. Vaughan and Novy in their book entitled "Cellular Toxins" state that the apparent increase in recent years in the number of instances of food poisoning, is due to the fact that the medical profession has only recently learned to recognize food infection as a source of disease. Unfortunately the term "ptomain poisoning" has come into quite general use to designate the illness due to infected food. C. E. A. Winslow says: "Food poisoning is rarely, if ever, ptomain poisoning; that is, an intoxication due to a pre-formed poison of alkaloidal nature, derived from a breaking down of the protein in food. The cases which have been carefully worked out in recent years have, on the contrary, proved to be due to infection with specific bacteria, or to intoxication with the toxins or synthetic products characteristic of these microbes."

While it is true that basic substances of bacterial origin (ptomains) constitute in some cases the actual cause of illness, this is not generally the case. Among the poisonous bacterial products there are many that are not basic, and many others concerning the chemical nature of which we know nothing. In many instances we are ignorant not only of the chemical nature of the poisons produced, but also of the bacteria through whose activity these poisons are elaborated, nor can there always be a sharp line drawn in cases of food poisoning, between intoxications and infections. According to Vaughan and Novy, the time will probably come when the true test of the specific character of a germ will be made with its chemical products. Up to now, the study of bacteriology has been largely morphological. The bacteriologist of the future will probably have to be a physiologist and a physiological chemist as well. The proper classification of bacteria in regard to their relation to disease cannot be made from their morphology alone, but must depend upon the products of their growth, and we should avoid the introduction into the alimentary canal, not only of known pathogenic germs, but of all toxicogenic organisms capable of growing and multiplying in the body.

Vaughan and Novy give the following distinctions between ptomains and toxins.

Ptomains. Ptomains are organic chemical compounds, basic in character, formed by the putrefactive action of bacteria on inert vegetable or animal nitrogenous material. Some are poisonous, others non-poisonous. They are often called putrefactive alkaloids.

Toxins. During disintegration, certain constituents of the bacterial cell pass into solution, and these soluble substances are probably the most important part of the cell, so far as the causation of disease is concerned. Toxins are non-basic, synthetic products, formed within the cell. Ptomains are split products, formed by action of bacteria on proteids.

There are three ways in which specific cases of food poisoning may originate, each of which will be discussed in detail:

1. The food is infected and the poison generated *only* or *wholly* before the food is eaten.

2. The infecting organism may begin the elaboration of its poisonous products outside of, and continue the same process within the body.

3. The infection may not result in the formation of poisons until the food is taken into the body.

I. The food is infected and the poison generated only or wholly before the food is eaten.

We find this group naturally subdivided into two parts: A. Cases of true ptomain poisoning. B. Cases of true intoxication.

A. Ptomain Poisoning.

Chemically, ptomains are ammonia substitution compounds, two-thirds of them containing only carbon, hydrogen, and nitrogen. Those containing oxygen in addition are most poisonous. Most of the known ptomains are inert or are no more poisonous than the corresponding ammonia salt. There is a time, during the putrefaction of nitrogenous matter, when the putrefactive products are most poisonous; after that the toxicity declines till the final products are wholly non-poisonous, poisonous cheese being most toxic when in the green stage of decomposition.

Ptomains were first studied by Selme, between 1880 and 1890. Between 1885 and 1890 Brieger made an extensive study of them, isolating a large number. Vaughan and Novy in our country have also done much work in this line.

The following are some of the best-known poisonous ptomains:

1. *Mytilo-toxin* ($C_6 H_{15} NO_2$) was isolated by Brieger in 1885 from poisonous mussels. He was unable to obtain this substance from mussels that had been allowed to putrefy 16 days. It is produced in greater or less amount during the life of the fish, if grown in filthy water, being elaborated by bacteria found in the water (piscicidus agilis). The amount of ptomain increases after death for a short time, then, as putrefaction continues, it disappears. This ptomain produces all the symptoms of mussel poisoning.

2. Tyrotoxicon, whose chemical composition is not definitely known, was isolated from cheese by Vaughan and Novy and others in 1888. It has also been found by these same men and others, in poisonous ice cream, milk, cream puffs, and custards. It produces vertigo, vomiting, severe rigors, numbness and prostration. Recent work has shown, however, that these articles of food may contain other toxic substances, not ptomains, of more importance in producing sickness than tyrotoxicon, which is not always present.

3. Cholin ($C_5 H_{15} NO_2$) is very widely distributed, pre-formed, in both the animal and the vegetable kingdom. It is also a product of decomposition. It is often found with muscarin, the poisonous principle of mushrooms.

4. Putrescin ($C_4 H_{12} N_2$) and Cadaverin ($C_5 H_{14} N_2$) usually found together, are not very poisonous, but are capable of producing inflammation and necrosis. The tetramethyl substitution product of putrescin is extremely poisonous.

5. Muscarin is normally present in the poisonous mushroom; Amanita phalloides, but is also produced in decomposing fish. It is extremely poisonous.

Some of the characteristics of ptomain poisoning are (1) sudden onset; (2) nervous symptoms (depression of mental and bodily functions, and convulsions); (3) gastro-intestinal symptoms; (4) heart failure; (5) almost a total absence of fever.

B. TRUE INTOXICATION.

The best example of this type of poisoning is in the disease called Botulism or Sausage Poisoning. It is misnamed, for sausage is not the only food that causes it; the disease may occur as the result of eating any nitrogenous food under certain conditions. A saprophytic organism, B. botulinus growing on the food substance in question causes all the trouble. This organism is strictly anaërobic, and is itself absolutely non-pathogenic, since it will not grow at temperatures above 95° F. It was first isolated and studied, and its relation to food poisoning worked out, by Van Ermengen in Belgium in 1895.

B. botulinus produces on nitrogenous substances a soluble, true toxin similar to the toxin of diphtheria, except that this toxin is produced only and wholly outside the body. This toxin is the actual cause of the disease. Its toxicity is readily destroyed by heat and its antitoxin can be prepared without difficulty.

The chief source of danger is raw or insufficiently cooked sausages, for the central portions furnish ideal anaërobic conditions for the growth of the organism and the consequent elaboration of its toxin. Prophylaxis consists in thorough and recent cooking of nitrogenous foods capable of providing such anaërobic conditions. The heat must be sufficient to penetrate through the mass and the cooking must be recent, for the organism grows rapidly in cooked food. The chief seat of attack of this toxin is the nervous system. Death may result.

Other organisms, as B. coli communis and B. proteus vulgaris, are believed, under similar conditions, to form toxins poisonous to man when eaten. Most probably such cases belong to this next group, however.

II. The infecting organism may begin the elaboration of its poisonous products outside of, and continue the same process within, the body.

It is almost impossible to distinguish this class from the next one — where the poisonous products are generated wholly after the food is eaten — as far as the causative organisms are concerned. For this reason they will be taken up together. About the only difference in the two cases is in the incubation period of the resulting disease and in the duration of the illness. Naturally, when some of the toxin is formed in the food at the time it is eaten, the consumer becomes ill much sooner, and death, if it results, comes much more quickly than if all the toxin formation has to take place in the body. These latter infections resemble typhoid fever, while the others resemble acute gastro-enteritis.

To these two groups belong the majority of cases of meat poisoning, and such poisoning is almost always due to bacteria of the paratyphoid or hog cholera group. Meat may become infected with these organisms in several ways:

1. As a result of disease in the animal before slaughter. Animals suffering from puerperal fever, uterine inflammation, navel infection, septicemia, septic pyemia, diarrhoea, and local suppurations are apt to furnish meat containing one or more of these organisms.
2. From soiled hands, butcher's tools, rags, paper, dust, or other objects that come in contact with it.
3. From carriers (paratyphoid).

Savage gives the following classification of the group of organisms implicated in cases of meat poisoning:

1. True Gärtner bacilli — culturally the same but capable of being differentiated by agglutination and absorption tests:
   a. B. enteriditis Gärtner,
   b. B. sui pestifer (hog cholera bacillus).
   Bainbridge regards these two infections as always derived from infected animals or food infected after slaughter.
   c. B. paratyphosus B.
   d. B. morbificaus bovis.
2. Para Gärtner bacilli.
3. B. paratyphosus A.
   These last two organisms are rarely thought to cause sickness. Bainbridge regards paratyphoid infections as always due to human bacillus carriers.

Savage states that this whole group is a sub-group of the larger Colon-Typhoid group, and stands midway between the *chemically active* colon group and the *chemically inactive* typhoid group.

Recently, March 21, 1914, there was an editorial discussion in the Journal of the American Medical Association, of an outbreak of food poisoning at Cholet, France, which is interesting for several reasons. Thirty-eight out of fifty people became violently ill from eating a custard covered with a browned meringue. From uncooked portions of egg white remaining a peculiarly toxic paratyphoid bacillus was isolated, which reproduced the symptoms exactly when inoculated into suitable animals. The browning of the meringue by forming an air tight cover, had provided ideal anaerobic conditions, and as the custard was eaten the day after it was made, in most cases, there was time for abundant bacterial growth. The custard that was eaten the same day it was made produced no illness. The danger from food so contaminated is not only from bacilli ready to grow in the host, but also from toxins already produced by them in the food. The hundreds of cases of poisoning which have occurred from eating such creams and custards all have the one feature in common — that some portion of the egg has not been thoroughly sterilized by heat.

In the case in question the egg whites were contaminated by the cook, whose stools showed an abundance of paratyphoid organisms.

The interesting features of this outbreak are (1) the fact that the paratyphoid bacillus can cause acute poisoning — that it does not always cause paratyphoid fever; (2) the proof of the human carrier as a factor in cases of food poisoning.

B. enteriditis Gärtner is most frequently found to be the cause of poisoning of the acute gastro-enteric type. Many cases are on record of outbreaks due to this organism.

In health laboratories or other laboratories where examinations of blood are made for typhoid fever, it would seem advisable that the serum be examined for agglutinins of paratyphoid A and B and enteriditis, after it has been pronounced negative as far as true typhoid is concerned.

CHOLERA INFANTUM OR SUMMER DIARRHOEA OF INFANTS.

There are many micro-organisms, any one of which, when introduced into the intestines of an infant under favorable conditions, may produce diarrhoea. Many of these organisms are true saprophytes, feeding on the food found in the intestines — not on living tissues. Ordinarily common milk bacteria are harmless. As the only digestive juice known to have any decided germicidal effect is the gastric juice, if this secretion is impaired there is a possibility that these bacteria will pass on to the intestines, where they will grow and, if capable of so doing, produce chemical poisons which are absorbed, producing illness in the child. The pathogenicity of a bacterium is dependent solely on its ability to grow and multiply in the animal body. According to Vaughan, all bacteria are capable, under some circumstances, of producing the same poison. The question is then, is it ever possible for a given organism to grow and multiply in the human body? If so, then there is a possibility, sometime, of this poison being generated.

MISCELLANEOUS.

Under this heading will be discussed briefly those diseases supposed or known to be, due to the eating of certain vegetables or to the lack of certain dietary elements.

1. The number of species of poisonous mushrooms capable of causing death is not large. The Amanita phalloides or fly fungus, is the one responsible for the majority of such deaths. Muscarin, an alkaloid, identical with a ptomain produced sometimes in decomposing fish, is the poisonous principle.

Mushroom poisoning may be prevented by soaking the mushrooms in water acidified with vinegar before cooking.

2. Ergotism. This is a form of poisoning brought about by the prolonged use of meal made from grain contaminated with claviceps purpurea, commonly known as ergot, a fungus which develops in the flowers of rye and other grains. This disease is rarely found in this country, but it is common in Europe.

3. Potato poisoning. Potatoes normally contain a small amount .006% of a poisonous principle "solanin". Under certain conditions — as where, during growth, they have been partially exposed above ground, or where they have sprouted considerably — the amount of this poison may be increased to such an extent as to cause severe poisoning. Many such cases are on record.

In addition to the above poisonings, there are three or four common diseases thought or known to be due to monotonous and unbalanced diets in which one or more elements peculiarly essential to bodily health are lacking. These diseases are beri-beri, pellagra, scurvy, and rickets.

1. Scurvy is due to the absence in the diet of organic acids, either free or in combination, and usually results from a diet of peas, beans, and salt meat. Potatoes, cabbages, and roots of various kinds are efficient in the cure of this condition.

2. Rickets is a disease common among children and is due to a deficiency of calcium and magnesium salts in the diet, causing the bones to remain soft.

3. Beri-beri. This disease is very common in Asiatic countries, the Philippines and some sections of South America, and is especially common in regions where polished rice is the chief article of diet. Some regard it as due to nitrogen starvation, others as due to polished rice, the pericarp or bran which is removed being thought to possess some constituent essential to the body. This constituent is thought by some to be phosphorus.

Both this disease and pellagra resemble infectious diseases in many respects. The incidence of the diseases is lessened where sanitary conditions are improved. Both affect the young, strong, and active in greatest proportion, and both are almost wholly confined to the very poor and illiterate. These facts can be explained by the unbalanced diet theory as follows, according to Goldberger: Extremely poor people are apt to be careless as to their personal cleanliness and their sanitary surroundings. This leads to slovenliness in preparation of food, and since such people are necessarily limited in the variety of food they can procure, they soon get in the habit of eating the same things all the time, prepared in the same way, and always in the quickest and cheapest way. Young, active, growing individuals necessarily require more food and a greater variety, and, when they do not get it, succumb to the result of this deficiency more rapidly than older, less active people.

4. Pellagra. The theories as to the cause of this disease, which is becoming so prevalent in some sections of this country, are very numerous. For many years the spoiled corn theory of Lombroso of Italy was the only one considered. Recently other workers, notably Siler and Garrison in this country, and Sambon in France, have claimed that it is infectious, and transmitted like malaria, by means of insects or parasites. Others have regarded it as being of photodynamic origin, dependent on a noxious substance present in the skin, which is activated by certain rays of sunlight. Goldberger, of the United States Public Health Service in charge of pellagra investigations, has discarded all these theories and regards it as due wholly to the use of a "diet in which some essential element is reduced in amount or from which it is altogether absent, or to the use of a dietary in which some element is present in injurious amount." "It is caused in some way such as, for example, by the absence from the diet of essential vitamines, or possibly, as is suggested by Meyer and Voegtlin's work, by the presence in the vegetable-food component of excessive amounts of a poison such as soluble aluminum salts."

In the cases investigated by Goldberger there was always a disproportionately small amount of meat or other proteids, and a disproportionately large amount of vegetable food in which legumes were almost wholly lacking.

In conclusion I wish to state that the relation of foods to the causation of disease is yearly assuming a more important place, as more work is done and more data becomes available. Several not inconsiderable outbreaks of various forms of food poisoning have been reported in Ohio in recent years. The health officer, as the guardian of the public health, should be so familiar with the whole subject, as to be able to investigate scientifically, outbreaks within his jurisdiction. Of more importance than the above, however, would be the building up of a system of food inspection, and the education of the people of his community in household prophylactic measures, so that such outbreaks would be impossible.

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PRACTICAL FOOD INSPECTION.*

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In reading a paper on this subject before an audience of this character, I do not feel it necessary to go into any detail regarding the necessity of this branch of public health work. It is an established fact that the health of our citizens who must rely upon the work of others to provide the necessities of life, demands the purity of our food products, and the necessity of a food inspection department in our city government is recognized by all who have given any thought to public health work.

I shall, therefore, not discuss in detail the need of food inspection nor the scientific application of it, but will simply outline to you how this important branch of municipal service is carried on in Columbus.

In order to systematize the work of the division, we have the work divided into the following subdivisions:

Meat inspection, Dairy inspection, Milk inspection, Market inspection and the inspection of commercial industries.

We will now take up each of these subdivisions in turn and endeavor to outline to you how and what is being done.

Meat Division. The various animals which are used for human food are subject to various diseases which render them unfit for consumption, but the presence or effects of the disease is, unfortunately, not usually discernible in the dressed carcass. A piece of meat may carry the germs of a dangerous disease without giving any outward indication of the fact to the consumer or even to the expert inspector.

To detect diseased conditions and pass judgment upon the affected carcasses, an expert inspection must be made at the time of slaughter.

To protect the public where they are unable to protect themselves is, generally speaking, the object of meat inspection. Diseased and unwholesome meats are the direct cause of sickness in those who eat them. The consumer, being unable to determine whether or not the meat which he buys is free from disease, demands protection. It then becomes the duty of our health officials to protect the consumer from the unscrupulousness and ignorance, or both, of the people engaged in the meat industry.

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* Read before Conference of State Board of Health with Municipal Health Officers, 1915.

About one-half the meat supply of Columbus is slaughtered and prepared under local inspection, the other half being federal inspection. There are approximately one hundred thousand animals slaughtered locally per year. Had our city a municipal abattoir, the question of meat inspection could be readily solved, but when these one hundred thousand animals must be inspected in over half a hundred killing places, the problem becomes one to ponder over.

The municipal abattoir is undoubtedly the perfect way of handling this work; but when a city is carrying all the bonded indebtedness possible, it is useless to ask for an appropriation sufficient to erect such a building. This is the condition Columbus was in in 1911, no funds to build a municipal slaughtering place, diseased animals being sold on our markets, and an epidemic of hog cholera raging. Shippers and farmers, knowing Columbus had no inspection, were using our markets for a dumping ground for their diseased live stock. Knowing these conditions, an emergency was declared to exist by our board of health, and council was asked to issue sufficient bonds to carry on this work for one year when it was hoped the costs could be added to our regular appropriation. Council passed the bond issue and our meat inspection service was established in June, 1912.

We have at present fifty-six slaughtering places under local inspection. Forty of these places are either located within the city limits or within a radius of one mile from the city; the other sixteen are scattered about the surrounding country within a radius of twenty-five miles. All inspection in the city and within one mile of the city is furnished free of charge, but beyond the one mile radius inspection is charged to the butcher at the rate of sixty cents per hour, time being counted from the time the inspector leaves the inspection office until he returns. In this manner the inspection of outlying places is made practically self sustaining.

This charging feature greatly cuts down the number of farmers and country butchers which we would otherwise have to contend with at considerable expense. In a way, I think one phase of our charging system is unfair, and were I drafting a new ordinance I would make the free limit the city limits and charge for all inspection furnished outside parties. Butchers operating plants outside the city limits are at much less cost and do not have to pay our city taxes. It is therefore not right that they should be placed on an equal basis with those who operate plants within the city.

When our new regulations went into effect, each butcher known to be doing business in our city was sent an application blank with instructions to fill out and return. On this application, among other things asked for, was a statement as to the number of animals slaughtered daily, together with the exact time at which inspection was desired. From these applications the inspection office was able to estimate how much time would be consumed by each establishment. In this way schedules were worked out and routes arranged with very little opposition from the butchers.

In arranging the schedules the applications of a given section of the city were carefully gone over in an effort to arrange the work so that the butchers, as well as the department, would be put to no great inconvenience.

The following is a section of our general schedule:

MONDAY.

Inspector Stuart.

A. M.		P. M.	
6:30	Christ	1:30	Bangert,
7:30	Boehler,	3:30	Huffman.
9:00	Schwaderer,		
10:00	Kiner.		

In this way the work is laid out in advance for each regular inspector. As some days are busier than others we have days when all the inspectors are not called upon for post mortem duty. The ones not scheduled are then used in other branches of the work, such as inspections of stock yards, inspections of sausage factories, groceries, markets, etc.

When inspectors make their regular visits to the different abattoirs and yards all animals in the pens are carefully inspected on foot. Suspicious appearing animals are given a very close examination. In case an infectious disease is suspected, such as hog cholera, the temperature of the suspected animal is taken and recorded. Should the animal prove to be suspicious, it is marked by placing in its ear a metal tag bearing a number and the words, "Columbus Board of Health Rejected". A statement is then given to the owner, bearing the tag number, cause of rejection and temperature. This statement must accompany the animal wherever it is sent for slaughter and be turned over to the inspector stationed at the abbatoir before the animal in question is allowed to be taken to the killing room.

Animals so rejected on foot are killed only after the regular killing for the day is completed, when they are given special inspection.

The larger food producing animals — cattle and hogs — are slaughtered only in the presence of an inspector, when they are carefully gone over in every detail. The head, tongue, thymus gland all viscera, parts and blood used in the preparation of meat food products are retained in such manner as to preserve their identity until after the post mortem examination has been completed, in order that they may be identified in case of condemnation of the carcass.

Carcasses and parts thereof, found to be sound, healthful, wholesome and fit for human food, are marked with an indelible stamp showing that they have been inspected and passed for food; the stamp also bears the number of the inspector who made the examination. Should any lesion or disease or other condition be found, it is judged in accordance with the regulations relating to the inspection of meats as prescribed from time to time by the Department of Agriculture of the federal government.

All condemned or retained carcasses or parts are disposed of only in the presence of an inspector, and a report of the disposition is made by him to the inspection office on his daily report.

Any meat or meat food products condemned at establishments which have no tanking facilities are thoroughly slashed with a knife and then denatured with kerosene.

Realizing the small percentage of disease among the smaller animals—calves and sheep—we have worked out the following system in order to facilitate our inspection: Butchers are allowed to dress calves and sheep at any time providing they are dressed as follows: Calves dressed with the head, navel and kidneys attached to the carcass by natural attachments; the heart, liver and lungs are removed, washed and tagged with a triplicate numbered tag, a section of which is placed on the carcass. Sheep are dressed in a similar manner except that the head and navel are removed (the heads are, however, required to be left attached at present owing to the foot and mouth epidemic). In this manner large numbers of these animals can be killed and dressed previous to the scheduled arrival of the inspector.

On the markets we have established so-called inspection booths where animals dressed, as prescribed above, may be taken for inspection at designated times; that is, on market days at our different markets at a specified time an inspector is stationed at the inspection booth to inspect and stamp all such animals as are brought to the booth for that purpose by butchers having a license to slaughter for Columbus markets. In this way butchers living beyond our free inspection radius may obtain free inspection of their small animals. Monthly sanitary inspections are made of all the killing places located outside the free district to ascertain the sanitary conditions under which the meats are dressed. Should the owners of such killing places fail to keep their places of business in good sanitary condition or fail to pay their inspection bills promptly, inspection is at once withdrawn until such time as all violations are corrected.

Since the establishment of complete inspection in June, 1912, the following amount of work has been done:

Visits made to slaughter houses and other places where meat food products are prepared	24,288
Animals examined on foot	330,555
Animals rejected as suspicious	404
Animals examined on post mortem	295,303
Animals found diseased on post mortem	8,850
Animals condemned on post mortem	1,433
Parts of carcasses and organs condemned (pounds)	200,491

In addition to this a large number of carcasses are found yearly affected with cysticercus bovis which are retained a prescribed time and released.

The force engaged primarily in this work consists of six men with four extras for emergencies. The extra men when not needed on post mortem work are used in other branches of food inspection.

The cost to the city for safeguarding its meat supply is approximately $12,500 per year.

We do not consider our system of inspection the most economical possible to have, but unless a municipal abattoir were provided, I do not think this volume of work could be carried on at any less cost.

Dairy Division. — As the name implies, the work of this division consists in the inspection of dairy farms. Columbus began real dairy work in 1903, at which time one inspector was employed whose duty it was to inspect milk wherever handled or sold in the city, to collect samples and to inspect the dairies supplying the city with milk. Prior to this time the inspection of milk and dairies was confined entirely to city work and was simply a kind of milk inspection.

The two branches of this work have grown until a complete separation has been made; that is, certain men are now assigned to each branch of the work. I have found it advisable, wherever possible, to clearly define an inspector's duties and work, so that he may be held responsible for its condition. Our inspectors are all asked to familiarize themselves with all city ordinances relative to food inspection so that they may observe conditions and report violations noted outside of their respective departments to the inspection office. In this way, with inspectors working in all parts of the city doing their own particular line of duty, but observing what is going on around them in other branches of the work, the way of the person who endeavors to violate our pure food laws is not an easy one.

There are at present slightly over twelve hundred dairies supplying Columbus with milk and sweet milk products. These dairies are located within a radius of seventy-five miles of the city. At present we have three inspectors who devote their entire time to this work. The three districts are laid out so that there is no overlapping and each man looks after the dairy farms located in his territory. By this arrangement, each inspector has four hundred farms to visit. As our men average approximately seven dairies per day for five days each week, it takes them ten weeks to go over their route once. Unlike some cities, our inspectors are continually at their work, that is, we inspect all through the winter months the same as in summer. It is my opinion that dairy inspection is more essential in winter than in summer, and milk inspection most essential in summer.

Each dairy farm inspector is furnished with a horse and buggy for his conveyance, and all living and traveling expenses incurred while outside the city are borne by the department. The inspectors are furnished with traveler's expense books and receipt books, whereby a daily itemized statement is made of all expenses incurred in the city's service. At the end of each month these books are checked over and the men reimbursed by the city treasurer.

Unless working near the city, the inspectors leave the inspection office Monday morning and do not return to the city until Friday night. Each day they are required to mail to the office a daily report showing the amount of work done, together with the dairy score of each farm visited and a copy of all notices served. These reports are checked over and recorded, the dairy scores filed for reference and the notices held until the inspector is again ready to start over his district. In case the inspector has found it necessary to exclude a dairy whose product comes directly to the city, the exclusion notice is given to the milk inspector whose duty it is to hold up any shipments which might come from the excluded farm.

Our method of controlling and regulating the milk supply, is the same as it followed in the meat division, that is, by permit.

The ordinance is as follows:

> "No one shall engage in the sale of milk or cream in the city of Columbus, Ohio, ship same into the city for sale, or supply to others for use in the city, unless he shall first obtain a permit from the Board of Health to do so."

You will note that this ordinance says "or supply to others for use in the city". That section of the rule has been declared unconstitutional by our law department, they holding the permits could not be required where the sale was made outside the city limits. It therefore became necessary for us to revise our code so that we could control those supplying others outside the city who, in turn, sold their product in the city. The following ordinance now covers that point:

> "No person or persons shall sell, offer for sale, or have in possession with intent to sell, any milk or cream from any dairy which has not a permit from this office, or for which there has not been filed, with the Chief Inspector, an application to sell such milk."

In this way we are able to keep complete check on all dairies. If they sell directly into the city they must make application for a permit; if they supply to others for use in the city, the person handling their product must apply for permission to do so.

Upon receipt of an application the applicant is notified, in person if he calls at the office, or by letter if the application has been received by mail, that he may begin the sale of milk at once and his dairy will be inspected upon the next visit of the inspector in his district. A copy of our dairy requirements is furnished the applicant with instructions to arrange his dairy to comply with the regulations at once. In this manner, we are immediately in touch with the dairyman and impress upon him that if he wishes to dispose of his products in this city, it will be necessary to conform to the requirements.

The regulations given each new applicant are simply those pertaining to the farm, and they are printed so that there can be no question as to their meaning. In this way, we bring before the beginner at once and in a plain way, just what will be expected of him if he wishes to dispose of his products in our city.

The dairy inspectors when starting out on an inspection trip have in their possession the notices served on the previous inspection and all applications which have been received since their last visit. They visit each dairy in their district, examine the cows as to their apparent health and cleanliness, examine the dairy barn, the surroundings, the milk house, the utensils and the water supply. These are all scored according to their condition upon a score card which is a form copied from the one used by the dairy department of the federal government, and a carbon copy of the score is left with the dairyman with an explanation as to how his score may be increased.

A careful inquiry is made as to the health of the community and of each dairyman's family. Should a condition in violation of any section of the code be found, the owner is given notice to correct the condition by the next visit. In case the condition is bad or is a repeated violation, the inspector orders the owner to discontinue selling his product in Columbus until such time as he sees fit to comply with our requirements. Should the person excluded be selling his products to a creamery outside the city limits, the creamery manager is notified of the exclusion, and should he refuse or fail to stop handling the products in question, his permit to sell in the city is revoked.

Previous to 1911, the only dairies inspected where those furnishing milk and sweet cream. At this time we found that some ice cream manufacturers, in order to avoid drawing their product from inspected sources, and consequently paying slightly higher prices, were getting their cream in the form of condensed whole milk, thus avoiding the inspection. An investigation of the source of some of this condensed milk, showed the urgent need of inspection. Our regulations were then revised and at present all dairies supplying milk, sweet cream and condensed milk when used in ice cream making must come under inspection.

Milk Division. To this division is assigned the work of supervising the handling of our milk supply from the time it enters the city limits until it is delivered to the consumer. The importance of this work is becoming greater each year. As the city increases in size, it draws its milk supply from a greater distance; this necessitates a larger percentage being handled in the city and consequently more need for inspection.

The man best fitted to fill the position of milk inspector, is one who has not only been trained in the scientific side of milk handling but one who has had practical experience in creamery or milk plant work. We have one man looking after this work. It is his duty to visit the different receiving stations, inspect the milk for temperature. cleanliness, cleanliness of containers, to collect samples, to see that dealers are prompt during hot weather in removing the milk to their respective plants, that cans are properly sealed, that only clean and dry cans are returned to the station, to collect samples from retail wagons for both bacteriological and chemical examination. In this work the inspector stops the wagons as they are delivering about the city, enters the wagon, inspects the contents for cleanliness and temperature, and takes a bottle for examination, giving the dairyman an empty bottle in exchange. The dairyman's name, location, date, time of day and temperature are then entered in a book kept for such purposes, and the salesman asked to sign a receipt showing a sample was collected. In this manner it is not necessary to have a witness to the sampling, the sample is labeled, numbered and turned over to the chemist for examination.

It is also his duty to inspect all the milk plants, score their condition on a sanitary score card visit restaurants, groceries, confectioneries, etc., to collect samples and observe how the milk is handled.

The regular grocery inspectors, three in number, are also trained to inspect the milk offered for sale in the places they visit. As all the milk is bottled, they simply inspect it for cleanliness, cream line and see that it is stored in a separate compartment of the coolers.

The milk inspector also looks after the conditions under which ice cream is manufactured. When we began inspecting ice cream factories some of the most deplorable conditions imaginable were found. A large majority of the plants were located in cellars, some without any light and ventilation. Of the ones located above ground, some were found to be a portion of the owner's living apartments. I remember very distinctly one place which we located after considerable trouble, by following the peddler's push cart when he finished business for the day. His factory and home were one and consisted of one dark back room in a cheap tenement house. He made his ice cream, cooked his meals, ate and slept all in one room; the space under his bed served as a store house for his cans, utensils and supplies. Several other places were found almost as bad as this one.

As a result of this first year's inspection, our present ordinance was drawn, which specifies, among other things, that the building used for ice cream manufacture shall be well lighted, ventilated and used for no other purpose than the manufacture of ice cream.

The cost of operating our milk and dairy inspection department amounts to $6,500 annually. The results achieved in this work since its inception, are shown by comparing the average bacterial count of our market milk supply for the years 1908 and 1913, (1914 not yet being available.)

The average count of all samples collected during 1908 was 920,000 per c.c. At this time there was no temperature standard, no bottled milk ordinance and no bacteriological standard. Since then our ordinance has been brought up to date and with our increased force of inspectors, conditions have been improved to such an extent that our average count for 1913 was 195,000 per c.c.—this being a reduction of 725,000 in five years. This plainly shows the effect of regulation on a city's milk supply.

Market Inspection. This work consists in the inspection of the public and private markets. We have four public markets and six hundred and fifty private markets or groceries. The work of inspecting the foodstuffs offered for sale in these markets is no small task and one worthy of consideration. The meat and milk offered for sale in these places has been under surveillance all the way through its production and handling. This, therefore, is the final stage of its long journey and a very important one. No matter how carefully milk has been produced, if it is allowed to be stored in foul, ill-smelling ice boxes at varying degrees of temperature, the work previously done on it goes for naught. No matter how carefully the meat has been inspected at the time of slaughter, if it is handled in such a manner as to expose it to flies, public handling, dirty ice boxes and other sources of contamination, it becomes a dangerous food product and the expense connected with its original inspection was a waste of the tax payers' money.

Inspectors are stationed at our public market all the time they are open for business. It is their duty to see that all meats offered for sale bear a stamp, that the ice boxes in which meats are stored on the markets are kept clean, that guards are provided so that the public cannot handle or finger their proposed purchases, which may be dangerously contaminated by indiscriminate handling; in short, to see that all food products offered for sale are pure and wholesome. This is a very important work and when carefully carried out is of great benefit to the public.

The inspection of private markets is conducted along the same line. We have three inspectors who devote a portion of their time to this work. As stated before, they are meat inspectors who have not regular schedules in meat inspection; each man has a given section of the city to cover and it is his duty to see that every retail market on his district is kept in a clean and sanitary condition in accordance with the regulations. During 1913 there were 6,500 such inspections made or practically a monthly inspection for each place.

Commercial Industries. The work assigned to this division of our inspection service, is the inspection of candy factories, bakeries, bakery wagons and public eating places. Although we have only one man assigned to this work, I feel that it is one of the most important branches of our department and have repeatedly asked for more help.

There are at present one hundred and forty bakeries, twenty-eight candy factories and six hundred and fifty public eating places in Columbus. In addition to inspecting these places the inspector assigned to this work inspects such miscellaneous factories as popcorn-fritter works, macaroni factories, mush factories, hominy factories and so-called refining works.

To those of you here who are at present making no effort to inspect such places of business as are mentioned above, I would advise you upon your return, to make a personal visit to some of your public kitchens or factories where foodstuffs are prepared or handled. If you do not find conditions which warrant frequent inspection of such places, you may consider your city very fortunate indeed. Columbus, I believe, has the only municipal code in the state regulating the sanitary conditions surrounding the manufacture of confections.

The code is as follows:

"All rooms or buildings used for the manufacture, handling, storing or selling of candies or other confections must comply specifically with the following requirements:

> Sec. 1. (Construction.) Floors shall be of water tight construction and maintained in a sound condition, walls and ceilings shall be smooth and tight, and kept painted in some light color; window space shall be equivalent to at least ten (10) per cent of the floor space. Toilet rooms shall not be in direct connection with any such room. Efficient washstands shall be provided.
>
> Sec. 2. (Cleanliness of Help.) Every employer is required to maintain himself and his employees in a clean condition while engaged in the manufacture or preparation of candies or confections.
>
> Sec. 3. The walls, ceilings, floors, windows, furniture and all cooking devices and utensils shall be kept absolutely clean and sanitary at all times.
>
> Sec. 4. No person or persons shall be allowed to sleep in any room where candies or confections are prepared or manufactured, nor shall any person use tobacco in any form in any room where candies or confections are prepared or manufactured.
>
> Sec. 5. All rooms used for preparing or manufacturing candies or confections must be kept free from dampness, roaches, ants, bugs or other insects, rats or mice.
>
> Sec. 6. During fly season all rooms used in manufacturing or preparing candies or confections shall be kept free from flies either by screens or revolving fans.
>
> Sec. 7. It shall be unlawful for any person suffering from any contagions, infectious or venereal disease to engage in the manufacture, preparation, or sale of candies or confections.
>
> Sec. 8. It shall be the duty of every proprietor engaged in the manufacturing or preparing of candies or confections to post or cause to be posted a copy of these regulations in a conspicuous place in every room used for such purpose.
>
> PENALTY. Whoever violates or obstructs or interferes with the foregoing rules and regulations shall be fined in any sum not exceeding One Hundred Dollars ($100.00) or imprisoned for any time not exceeding ninety (90) days, or both, but no person shall be imprisoned for any violation or failure to obey any of the rules and regulations for a first offense."

This code was adopted in April, 1912, after a thorough examination of all so-called candy factories in the city. The inspection showed some of the most unsanitary conditions imaginable. A large percentage of the candy factories were, at that time, located in cellars or basements, dark, poorly ventilated, foul-smelling and overrun with rats, mice and roaches.

In addition to the unsanitary conditions found, the help employed in such work was dirty to such an extent that the mere sight of them was respulsive. In making an inspection one afternoon of the factory of one of the most prominent confectioneries on High Street, one of the help was found washing his feet in a kettle used to make candy in. A great many instances of a similar nature could be cited, but I think that one should be sufficient.

Since the adoption of our regulations, such places as mentioned above have been forced out of business or into sanitary quarters.

One of the largest candy factories in the city, which at that time was operating in an old dilapidated building with a dark, poorly ventilated cellar where a large portion of their chocolates were made, is now housed in one of the most sanitary factories possible to construct and there is no room of this factory but what is perfectly lighted and ventilated.

The unfortunate part of this matter is, that perhaps 50% of the confections sold in the city are manufactured elsewhere, a source over which we have no control, but we do know that those manufactured in Columbus are prepared amid clean surroundings and by help which are cleanly dressed and free from dangerous contagious diseases.

The inspections of bakeries, public eating places, etc., are made as frequently as our limited help will permit. The inspector assigned to this work is a man who has had a wide experience in this line of work; he is supplied with a powerful pocket lamp by which he is able to see the condition of all places he visits. These places are inspected as to construction of walls, ceilings and floors, as to drainage of floors, ice boxes, etc.; as to cleanliness of floors, walls, ceilings, ice boxes, utensils and fixtures; and the cleanliness of attendants is also observed. In addition to this, all food products on hand are carefully inspected. Should conditions be found in violation of the sanitary code regulating such places, orders are at once given for their correction. Should the owner refuse or neglect to comply with orders after sufficient time has been given, his place of business is either closed or he is arrested.

During the year 1913 thirty-five hundred inspections were made by this division. It was found necessary to serve six hundred and eighty-two written orders; that is, one of every five places visited was found unsanitary in some respect. There were six hundred sixty-six abatements secured on these notices, twelve places closed for failure to comply, and twenty-one arrests made. This should give you a general idea of the scope and results of this work.

Our greatest handicap in regulating such places, especially bakeries and public eating places, is the lack of a license law, I am a firm believer in regulating food inspection by license, and I feel that had we a license law requiring every operator of such a place to obtain a permit from the local health department before he be allowed to open his place of business, it would do much toward assisting this work.

Our department has repeatedly endeavored to secure an amendment to the present state law which gives boards of health the right to license meat and milk dealers, to make it cover bakeries and public eating places, but as yet we have been unsuccessful. I feel that if all the principal cities in the state would make a concentrated effort to obtain the proper legislation, a great good would be accomplished.

In conclusion, I wish to say, that I hope I have not wearied you with the length of my paper; we do not set our department up as a model, but we know that we are getting results and we know that for every dollar spent for food inspection in our city, the tax payers are receiving value.

PUBLIC HEALTH NURSING IN OHIO.

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State Supervising Public Health Nurse, Ohio State Board of Health.

In 1859 the first system of district nursing was founded in Liverpool by William Rathbone. The idea of this system was to provide nurses for the sick poor in their homes. Within four years from that date the entire city of Liverpool had been divided into eighteen districts, with at least one nurse in each, who worked with the voluntary committee which held itself responsible for the nursing of the sick of that district. The success of this idea was instantaneous and it rapidly spread throughout the United Kingdom.

In America the first system of district nursing was established in 1877, when the New York City Mission engaged the services of a Bellevue Hospital graduate to send her to nurse the poor in their homes. The development in America was somewhat slower than in England until early in 1900, when there was an amazing growth of this form of social work, which has been increasing ever since.

The first public health nursing service in Ohio was that established by the Maternity Society of the Protestant Episcopal Church of Cincinnati in 1881. The society was formed with the object of providing the services of a physician and a visiting nurse to destitute women in child-bed. These services were given to all who needed them regardless of creed. It was eleven years before there was another step taken toward public health nursing in Ohio, and again it was in Cincinnati, where Christ Hospital established a visiting nursing service in 1890. This service was broader in scope than that of the Maternity Society, in that it sought to care for surgical, medical, obstetrical, contagious and tuberculosis cases. In 1895 a visiting nurse department was established in connection with the Deaconess Home in Cleveland, and three years later the Instructive District Nursing Association of Columbus was organized. Between 1900 and 1910 various kinds of public health nursing services were established in Toledo, Dayton, Cleveland, Cincinnati, Youngstown, Canton and Columbus. Today if we examine the public health nursing work done in the larger cities of the state we find that it covers practically every form of specialized nursing,—obstetrics; infant welfare, both pre-natal and post-natal; school nursing; tuberculosis nursing; general visiting nursing; industrial nursing; and social service. The organization of the various visiting nursing associations in Ohio's larger cities is so well established and the work so well carried on that the Division of Public Health Education and Tuberculosis is devoting its attention more to the smaller cities and villages, where people do not know just what a public health nurse is nor the nature of her work.

The term "public health nursing" is very broad and comprehensive in its meaning and includes within its scope the care of the sick in order that they may recover from their sickness, or at least be made more comfortable if recovery is impossible; the prevention of sickness in those who are well who might become sick either by their contact or association with those who are sick, or by adverse conditions of living. Each individual must be considered as a member of society. If one member suffers, society is so much the worse off. From this it is evident that the work of the public health nurse is both practical and educational. It includes both nursing and social service, cure and prevention. The nurse seeks to urge upon the city and the state the realization of the common responsibility for the environment and health of their citizens. While a large part of public health nursing is done among the poor, it is no more a charity than are the public schools. The work is for the good of the whole community.

It has been estimated that 90 per cent. of sick people are sick at home and the visiting nursing associations have identified their services with all classes of people who are sick at home, with the exception of those whose incomes are sufficient to enable them to engage the services of a private nurse. As probably 20 per cent of the people of the United States have incomes of not more than $1000 a year, there is left a large class of self-respecting people who are not willing to be classed with those entirely dependent upon charity, but whose incomes do not permit the engagement of a private nurse nor the payment of the full cost of a bed in a hospital; but they are not willing to accept assistance, material or medical, as a gratuity.

"The public health nurse is a product of evolution. She has developed from the old fashioned district or visiting nurse who visits and nurses the sick poor patient in his home. She is still that same visiting nurse and, also, according to the demands of the community which she serves, a public school nurse, an infant welfare nurse, a tuberculosis nurse, a hospital social service nurse, a sanitary inspector, a truant officer, a social worker, a visiting dietitian, and even a midwife."

The scope and variety of the public health nurse's work are almost unlimited. She is a very active agent in the movement against tuberculosis. In that movement new laws have been enacted, new ordinances passed, appropriations made, departments and laboratories established, hospitals, sanatoria and other institutions built and equipped; but before the people are educated to the use of all this, the message of the expert and the scientist must be translated into the simplest terms and taught by patient, painstaking, oft-repeated demonstration. So when the scientists, physicians, law makers and demonstrators have done their part the visiting nurse carries the message into the homes of the people, and in actually going into the homes and gaining the confidence of her patients she discovers many things outside of nursing.

In infant welfare work the public health nurse strives to save the babies. Her care of them begins before they are born in teaching the mother how to guard her own health and how to prepare for the new comer. She cares for both mother and child at first, and after the mother is able to be up she may be of the greatest assistance to her in teaching the care and feeding of the infant. Mother and nurse may not speak the same language and the teaching then becomes a very difficult task. When there are feedings to be prepared instructions concerning the modification of milk must be given to the mother, who watches the nurse prepare the feedings several times and then prepares them herself under the nurse's supervision. The mothers are urged to live in cleanliness, quiet and regularity, to beware of flies, and to avoid the dangers of soothing syrups and other drugs not ordered by the doctor. If the baby is sick she sees that it is put in a physician's care before its condition becomes worse. The aim of infant welfare work is to cure sick babies and to keep well babies well.

There are special nurses who devote their entire time to the problems connected with the physical and moral growth of the school children. The school nurse is the natural result of medical inspection in the public schools. "In New York City, in 1903, before there were any school nurses, of all the written instructions sent to the homes by the medical inspectors only 6 per cent. were carried into effect, while 84 per cent. became effective later under the direction of nurses who interpreted the inspectors' directions to the mothers and taught them to give the treatments." Many a case of eye strain, defective hearing, adenoids and enlarged tonsils or other defect, has kept bright children from their proper development. Often the nurse finds children suffering from the lack of proper nourishment, or from bad teeth, lack of air and sunshine. When the wrongs are made right the child develops rapidly. The nurse teaches the children, in little talks on hygiene, the value of good air and cleanliness. She shows them how to use a tooth brush, and tries to make them take pride in being well and clean. She goes to the homes of the children, following up every case that needs nursing care or hospital treatment. Often the fathers and mothers are glad to take suggestions for better ways of living when they are given in a spirit of friendliness and not of criticism; and the foreign parents are interested in adopting what they consider "American customs." We look for the time when the schools shall be the headquarters of good health as well as of education, just as the hospitals and dispensaries are centers for the sick and injured.

Insurance companies, industrial plants and stores are now employing public health nurses because it is a good investment. No concern wants its employees sick, and the nurses have been able to do much to better the conditions of workers both in the factory and in the home.

Hospitals find that their work is incomplete without the service of the medical social worker, who follows up the case after his discharge from the hospital ward. Convalescents are sent to the country and seashore, bad living conditions and needed relief are reported to the proper authorities, homes are found for neglected children or temporary care provided for them while the mother is in the hospital. If a brace or a crutch is needed the nurse sees to it that it is provided.

The aged and the "shut-in" must often count the public health nurse as the only friend who can be depended upon to come regularly, rain or shine.

The only reason that the nurse's work has developed into such broad lines of social service is the fact that she has the privilege of entering the homes. She comes in working dress and is not above giving a bath or making a bed, changing a dressing, or rendering some other service which can be interpreted in terms of friendliness. This service is actual to the patient and to the family. Other problems besides sickness meet her on every threshold,—lack of employment, delinquency in children or adults, bad sanitation, poverty and ignorance in every form. The public health nurse cannot help being a social service worker, for in recognizing her responsibility toward the family health she must also regard the family as a part of the community, and therefore sees the civic aspect of her work and becomes a social part of the public health campaign.

In doing any work it becomes necessary from time to time to look back and see what has been accomplished. The need of accurate sociological statistics is felt in all public work. Opportunities for collecting data are open to the public health nurse and much of the material is accessible to her only, for day by day her work brings her in contact with conditions which she alone has an opportunity to observe and she can collect such statistics as will be of real and vital service in preventive work.

The coöperation of the health officers and the physicians is quite necessary for the complete success of the public health service. A good public health nurse in no way interferes with the doctor's practice. On the contrary, she helps him with his patients and sends new cases to him; for it is not in her province to diagnose diseases nor to recommend treatment nor medicines. Her nursing work is always under the physician's directions, and if on her rounds she finds a sick person or a child abnormal in any way her first care is to learn who the family doctor is and send the patient to him.

In 1912 the council of an Ohio city of about 36,000 appointed a public health nurse for tuberculosis work. She began her undertaking with the hearty disapproval of every doctor in the place. They did not exactly know the duties of such a nurse and they thought there was no need of her anyway. Her task was indeed a difficult one, for naturally a nurse looks to her doctors for help, advice and coöperation. After two years of uphill work she has proved to them all that she was needed, and she now has the good will and support of every one of them.

During the first ten months of her stay only one case of tuberculosis was reported to her by a doctor, and even after that almost every case that was reported to her was in an advanced stage. Now she reaches the incipient cases and they are cared for through the tuberculosis clinic which she has established. This clinic was started in December, 1912. It is open two afternoons each week and each patient is expected to report once a week. Each one is weighed, has his temperature and pulse taken and recorded at each visit, and treatment, advice and medicine given in accordance with his need. If he cannot get proper nourishment at home it is supplied through the federated charities. In 1914 the nurse discovered 25 suspicious cases that were not under the care of any physician, and when they were brought to the clinic for diagnosis were found to be tuberculous. If the patients get tired of going to the clinic and fail to report as often as the physician in charge advises, the nurse goes to the homes and finds out what is the trouble and brings them back; and always she is teaching them both in the clinic and in the homes how to take care of themselves and how to avoid spreading the disease, and encouraging them to carry out the doctor's directions. [The general death rate dropped from 16% in 1912 to 10% in 1914. In 1913 there were 51 deaths from tuberculosis and in 1914 there were 29, a difference of 22.] Two years ago it was thought there was not enough for a tuberculosis nurse to do and now the day is not long enough for her to accomplish all the work she sees to be done. That city could not spare her now and the people see the need of a school nurse and have already employed a second nurse to do the general visiting nursing.

In order that an understanding of the nature of the nurse's work might become general over the state, and with a view to stimulating and increasing the number of localities to make provisions for employing a nurse, a public health nurse competition was begun in 1911 by the Ohio Society for the Prevention of Tuberculosis in connection with the Red Cross Seal campaign, and has since been continued each year. The plan of the competition was to invite a selected number of cities where no work was being done in the fight against tuberculosis to enter the contest. This number never exceeded thirty in any one year. Those cities accepting the invitation agreed to return the entire proceeds of their sale to the State Society, and to each of the twelve cities selling the highest number of seals per capita the State Society sent a nurse for a period of one month. Contests have been continued each year since, and the work of the traveling public health nurse has been of untold educational value in the places which have been visited. Of the twenty-nine cities which have accepted the services of the nurse since this plan was first formed, twenty-two have organized permanent public health leagues which are actively engaged in improving local health conditions, and fifteen are maintaining a permanent public health nurse.

Under a law passed in 1913 the medical superintendents of county or district tuberculosis hospitals are empowered to appoint public health nurses. In case a county has not provided a county hospital, or joined with other counties in maintaining a district hospital, the county commissioners may appoint a public health nurse and pay her salary and necessary traveling expenses out of the poor fund.

Section 3153-2. Supervision of nurses. Such nurses shall be subject to the supervision of the medical superintendent of the county or district tuberculosis hospital and the state board of health. Where such appointments are made by the board of county commissioners, such nurses shall be subject to the supervision of the county commissioners and the state board of health. (Passed April 18, 1913.)

Section 7692. Each and every board of education in this state may appoint at least one school physician. Such boards may also employ trained nurses to aid in such inspection in such ways as may be prescribed by the board. Such board may delegate the duties and powers herein provided for to the board of health or officer performing the functions of a board of health within the school district if such board or officer is willing to assume the same. Boards of education shall coöperate with boards of health in the preventing of epidemics.

Section 7692-1. School physicians may make examinations and diagnoses of all children referred to them at the beginning of every school year and at other times if deemed desirable. They may make such further examination of teachers, janitors and school buildings as in their opinion the protection of health of the pupils and teachers may require. Whenever a school child, teacher or janitor is found to be ill or suffering from positive open pulmonary tuberculosis or other contagious disease, the school physician shall promptly send such child, teacher or janitor home, with a note, in the case of a child, to its parents or guardians, briefly setting forth the discovered facts, and advising that the family physician be consulted.

Obviously, it is within the power of the local board of health to employ a public health nurse. The great obstacle lies in the unwillingness of the council to grant sufficient funds to the board with which to pay her salary.

It usually falls to a small group of individuals in any community to initiate experiments in social service work. The plan has been to organize a local public health league in every city in the state. The purpose of such a league is to work, in coöperation with the local health authorities, for the improvement of local health conditions. As a means of accomplishing this, the employment of a public health nurse is advocated.

There are at the present time 42 county, district and municipal nurses reporting their work each month to the office of the State Board of Health. Several of these represent an organization which is employing from 4 to 24 nurses.

If the question should arise what towns or cities in Ohio have need of the public health nurse's services, I should say any community where babies are born to mothers who cannot afford the luxury of a special nurse, or where those babies are exposed to danger from lack of care or bad home conditions; any community where there are schools or factories; where there are people suffering from tuberculosis, or where there are cases of any kind of sickness or distress among the poor; where sanitary conditions are imperfect; or where old people grow helpless and outlive their friends.

IMMUNITY AND SUSCEPTIBILITY.*

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Secretary and Executive Officer, Ohio State Board of Health.

(*Continued from page* 313.)

ACQUIRED IMMUNITY.

Acquired immunity is that resistance which is acquired after having an infection; being artificially inoculated with the etiological micro-örganism of the infection (vaccination); or by being inoculated with the products remaining in the body after an infection, either natural or artificial, has taken place. Acquired immunity may be divided into two classes, namely, *active* and *passive*. *Active immunity* is that immunity resulting from an infection or vaccination. In it the body cells react and give rise to the formation of antibodies. When antibodies produced in active immunity are inoculated into other animals the immunity conferred is referred to as *passive immunity.*

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Active Immunity. Active immunity may be produced artificially in the following ways: By the injection of living bacteria; by the injection of bacteria of reduced virulence; by the injection of dead bacteria; by the injection of the secretory and excretory products of bacteria (toxins, etc.); by the injection of the disintegration products of bacteria liberated after the death of the cells (endotoxins) and by the injection of bacteria or bacterial products which in no way are related to the bacterium against which immunity is conferred.

As a result of the injection of living bacteria in small amounts or of bacteria of reduced virulence the body cells react and produce bactericidal substances (lysins, etc.) As a result of the injection of dead bacteria, the opsonins are increased in the blood. As a result of the injection of the secretory and excretory products of the bacteria, namely, toxins, anti-toxins are produced. As a result of the injection of the disintegration products of bacteria, namely, endotoxins, bactericidal substances are produced. In cases where bacteria or bacterial products, which are in no way related to the bacterium against which immunity is conferred are injected, it is probable that bactericidal substances are produced. This condition only occurs in rare instances.

Passive Immunity. Passive immunity may be conferred by the injection of antitoxins, and by the injection of bactericidal substances. In this type of artificially produced or acquired immunity the body cells do not react to any great extent and the injected antibodies remain practically unaltered. Various other antibodies may be injected into other animals and confer upon them passive immunity.

The principal antibodies produced in active immunity will be subsequently discussed.

THE ORIGIN AND OCCURRENCE OF ANTIBODIES.

The toxic and some of the non-toxic substances of bacteria and cells from other sources when introduced into the body of a suspectible animal usually have the power to produce *antibodies.* Substances having the power of producing antibodies are known as *antigens.* Among the antibodies produced are antitoxins, bactericidal and lytic substances, opsonins, antiferments, agglutinins and precipitins. The antigenic substances for these antibodies will be discussed later. The mechanism of action of the antigen is of interest. It is supposed that the antigen can combine only with the cell which has the proper combining groups or receptors. The antigen combines in the same way that food products combine with the tissue cells. In case there is no group in the tissue cell with which the antigen can combine that tissue is naturally immune to the antigenous substances in question. If all the tissue cells in the body are in this condition then the individual may be said to be naturally immune. It occasionally occurs that certain cells of the body are not susceptible to the action of antigens at one time while at another they are susceptible. For example, the red blood corpuscles of the young chick are not affected by the lysin-toxin in spider poison while those of the adult are readily hemolyzed (hemoglobin liberated). It also occurs in rare cases that the antigen when injected into an animal whose tissue cells show no affinity for it or no proper receptors, will remain in the circulation for days and weeks without combining and producing any effect. The antigen, for example a toxin, can be isolated from the blood in such a case in the same concentration and form as when it was injected. Some antigens have especial affinities for certain tissues, as for example, tetanus toxin and nerve cells. In this case, however, the large part of the antitoxin is produced by cells other than those of the nervous system. The production of antibodies for antigens probably occurs in the following way: the antigenous substances combine with the cells utilizing all the available receptors, leaving none open for food and thus perverting the general metabolism of the cell. In such cases there is a regeneration of these chemical receptors by the tissue cells which more than compensates for those with which the antigen has combined and as a result the cell discharges them (chemical substances) free into the body fluids.

The various antibodies are usually produced with more avidity by certain tissues than by others. Antibody formation may be of a strictly local character depending upon the point where the antigen is injected. For example, when abrin is placed in the eye, antibrin is produced, but only in the eye so injected. In the majority of cases the antibodies are produced in some special tissue or tissues at a distance from the point of injection.

Following the injection of an antigen into the body of an animal there is always a decrease in the resistance of that body and a decrease in the antibodies produced followed in a short time by a marked increase in their formation. The former condition is spoken of as the *"negative phase"* and the latter as the *"positive phase."*

Antibodies may be transferred from mother to young before birth, but only after fetal circulation is established. It has been positively demonstrated that antibodies are not transferred by the ovum or the spermatozoon directly. They are only carried from the blood of the mother and diffused through the placenta into the blood of the fetus. It has, however, been shown that the eggs of immunized chickens contain antibodies occasionally. This is "germ cell transmission" and not true hereditary transmission. The transferred immunity or antibodies do not remain over two or three months in the bodies of the offspring after birth.

Antitoxins. Antitoxins are socalled because they combine with and render inert the soluble toxins. Antitoxins are produced for all the bacteria producing soluble toxins and for the toxic substances of a large number of other plant and animal cells. Antitoxins are the free chemical receptors of certain of the cells of the body. That is, they are chemical substances which have been thrown off from the cells of the body and possibly were normally used for the purpose of taking up food substances. These chemical substances are produced in excess of those actually needed by the cell due to a stimulation of the cells by the toxin. The antitoxins are labile substances which cannot be analyzed. They are similar to euglobulins. They are composed of molecules of large size. Antitoxins when present in the body of an animal are protective and in many cases curative. According to Ehrlich, toxins are assumed to possess two chemical combining groups, one known as the *haptophore group* which combines with the cells and other known as the *toxophore group* which combines with the cell after the haptophore group has combined and this produces an intoxication of the cell. The haptophore group of the toxin molecule is thermostable (heat resistant) and the toxophore group is thermolabile (heat susceptible). When a toxin is injected into the body of an animal, or is produced during the process of an infection, the haptophore group combines with the cells with which it has an especial affinity with the receptors (chemical substances which are unsaturated and open to combination with other chemical substances) of these cells. The chemical receptors of the cells with which the toxin-haptophore group combine are designated as *haptophile receptors.* It is probable also that the toxophore group of the toxin combines with other chemical receptors in the cell after the haptophore and haptophile groups have combined. These are designated as *toxophile receptors.* The haptophore receptors of the toxin having combined with the haptophile receptors of the cells, the toxophore group of the toxin then combines and intoxicates, stimulates or sometimes kills the cells depending on the affinity for the cells and the concentration of this group. In case the cell is not killed, it is stimulated and begins after a time to return to its normal functions. All the available receptors of the cells having been occupied and combined with, the cell sets about to generate new chemical receptors in order that food substances and other chemical substances may be taken up. The cells produce these haptophile receptors in excess, that is, there is over-compensation, and they are subsequently excreted into the lymph and blood. These haptophile receptors are in fact the chemical substances which we know as *antitoxins*. It is not only the cells with which both the haptophore and toxophore groups of the toxin combine because of special affinity, which make all the antitoxins, but cells which are widely separated from those which have an especial affinity for the toxin, also produce antitoxin. For example, tetanus toxin has an especial affinity for nerve tissue but this tissue produces little of the antitoxins. In this case most of the antitoxins seems to be produced in the spleen, lymph glands and bone marrow. The haptophore groups of the toxin have at least combined with these cells and stimulated them to the overproduction of haptophile receptors.

It has been mentioned that the antitoxins are *protective* to the body infected. The haptophile receptors (antitoxins) before they are thrown off combine with the toxin-haptophore, and often the toxophore group does not have the opportunity for combining and killing the cells. This is in case there is no special affinity for the cells, as in the above mentioned chief antitoxin-producing cells in tetanus. In such cases frequently all the available toxin is bound and very little is left to combine with the tissue with which it has an especial affinity, as is the case with tetanus toxin and nerve tissue. The antitoxins serve in this instance as protective substances. Furthermore, in case the antitoxin is excreted into the blood and lymph it serves in addition as a *curative* agent, all the toxin which is produced combining with all the available antitoxin in the circulation and none is left to combine with the cells of the body. The maximum affinity is always between toxin and antitoxin rather than between toxin and cell, if there is any antitoxin present. Antitoxins are prepared artificially and used for both prophylactic and curative purposes in the treatment and used for both prophylactic and curative purposes in certain of the infectious diseases such as tetanus and diphtheria.

Antitoxins are also produced in the bodies of animals which are to all appearances immune to the toxins concerned. For example, the alligator is immune to tetanus but when tetanus toxin is injected into this animal tetanus antitoxin will be produced. In this case the haptophore group of the toxin has combined with certain of the cells of the body, but with such cells as give no opportunity for the toxophore group to combine, or have no affinity for this group. In the case of the alligator the nerve tissue seems to possess no chemical receptors for the toxin.

There are certain animals which are very susceptible to the action of certain toxins which will not produce antitoxin when the toxin is injected. For example, the guinea pig and the rabbit will not produce tetanus or diphtheria antitoxin when injected with small and gradually increasing doses of tetanus or diphtheria toxin. If the toxin is modified chemically by the addition of chemicals such as terchloride of iodine or by heat these animals may be immunized and will produce antitoxin. In this instance the virulence of the toxophore group is reduced and it is possible to inject the animals with more toxin, thus combining with more cells and finally liberating more antitoxin.

It should also be noted that animals of the same species vary in their power to produce antitoxin. The production of the product varies with the age and general condition of the animal and with the duration and the degree of toxicity of the toxin used. On account of this condition it is necessary to establish units or standards for determining the strength of antitoxins.

As stated in the discussion of natural immunity to toxins, there are some animals which when injected with toxins do not possess cells which have receptors open for chemical combination and as a result the toxin remains free in the circulation for varying periods of time. For example, as before stated, the frog is immune to tetanus and an injection of toxin will not produce any antitoxin. If tetanus toxin is injected into this animal it will remain in the circulaton in the same form as injected and can be withdrawn after a few weeks or a month.

The Mechanism of the Neutralization of Toxin by Antitoxin. At one time it was supposed that the antitoxin was but a toxin in a little different form but this has been absolutely disproven. The amount of antitoxin produced is much greater than the amount of toxin which is injected or produced during an infection.

The union between toxin and antitoxin is of a definite chemical nature. After these two substances unite the resulting compound is absolutely harmless and differs from both the toxin and the antitoxin in that it is much more stable.

In the beginning all experiments dealing with the union of toxin and antitoxin were performed in the body of an experimental animal (*in vivo*) but finally Ehrlich showed that they would act and combine equally well in the test tube (*in vitro*) and could be studied more easily.

The various toxins are neutralized by their antitoxins with varying rapidity. The concentration of these chemical substances, the temperature, the character of the medium in which they are placed, and the amount of electrolytic salts present, are accountable for the differences in length of time of combination. In the main these substances act like most chemicals and some of them show evidences of following the laws of multiple proportions. As a matter of fact the same laws which govern the union of toxin and antitoxin govern other antibodies and their antigens.

As before stated, toxins have a greater affinity for the free haptophile receptors of cells (free antitoxin) than for those still associated with the cells. Toxin and antitoxin will always combine, if the opportunity presents itself, before toxin and body cells will enter into chemical union. Furthermore, in certain instances, such as in diphtheria, when the toxin has been partially bound by the body cells and antitoxin is produced in sufficient quantities or is injected, the toxin-cell chemical union will be broken up and the toxin and antitoxin will combine. Obviously, antitoxins of this kind are very valuable in effecting a cure in certain infections. In the above mentioned cases, the union between the toxin and the cell is comparatively unstable but this is not true in every case, as for example, in tetanus or lockjaw. In this case when once the toxin is combined with the cells of the nervous system and other body cells it is very difficult to break up the chemical combination by the addition of antitoxin. It requires exceedingly large doses and these rarely act efficiently. The union between toxin and body cells in this instance is very stable. We have here an explanation why tetanus antitoxin is of so little use for therapeutic purposes. It is, however, of use as a prophylactic when free toxin is being produced in the body. Diphtheria antitoxin is efficient both as a curative and prophylactic agent for the reasons which have been discussed above.

Antitoxin like toxin is fairly unstable and such agents as heat, light, and chemicals, affect it and reduce the toxicity. It may, however, be dried and kept for long periods of time in the dark. It is necessary in the commercial preparation of antitoxin and in its experimental study to have a unit or standard of measurement.

Units of Antitoxin. In order to arrive at a standard it is necessary to accurately test a given antitoxin to determine the number of so-called antitoxic units it contains.

In the accurate study of the neutralization of the toxin by the antitoxin it is noted that adding fractional amounts of the antitoxin to the L° dose of the toxin (exact amount necessary to kill a 250 gram guinea pig) and injecting the resulting mixture into test animals (guinea pigs), there is not always a corresponding decrease in the toxicity as would be expected. The toxin is made up of various parts. The part just mentioned has a great affinity for the antitoxin but is not really toxic. Such parts of the toxin molecule are called *protoxoids.* The protoxoids compose about one-fourth of the amount of toxin necessary to saturate one immunity unit. After the one-fourth antitoxin is added to the L° dose of toxin the mixtures of toxin-antitoxin become less toxic for the experimental animals down to the point where approximately three-fourths of the amount of toxin necessary to saturate one unit of antitoxin has been used. (Three-fourths of the L° dose.) This fraction is *true toxin.* The toxicity of the mixture does not decline from this point when antitoxin is added up to one immunity unit, and it has been demonstrated by Ehrlich and others that this is due to another part of the toxin molecule which has a lesser affinity for the antitoxin than the true toxin itself and the protoxoid. This part of the molecule is called an *epitoxoid, true toxoid,* or *toxon.* The toxin molecule necessary to saturate one unit of antitoxin is, therefore, made up of *one-fourth protoxoid, one-half true toxin, and one-fourth epitoxoid, true toxoid* or *toxon.* The toxon is in certain instances slightly toxic and is supposed by some to be a secondary toxin and in certain diseases such as diphtheria, this substance has a weak affinity for antitoxin and is a possible cause of diphtheritic paralysis.

Antitoxins may be prepared for all the bacteria producing soluble toxins, such as *Bact. diphtheriae, B. tetani, B. botoulinus* and *Ps. pyocyanea.* Antitoxic substances may also be made for some of the products of other bacteria such as the *Strept. pyogenes* but these differ from true antitoxins. Anti-toxins may also be prepared for the toxins of certain plant cells, such as abrin, recin, crotin, and for the toxins of animals such as snake venom, and spider poison. These substances are in the main similar to those produced by bacteria although in certain characteristics they differ materially.

Lysins and Bactericidal Substances. Under the lysins will be discussed those substances occurring in normal and immune sera which have the power of destroying and disintegrating bacteria, those disintegrating and liberating the hemoglobin of erythrocytes (red blood corpuscles) and those substances which have a lytic action on various body cells. The substances which act on the bacteria are called *bacteriolysins,* those acting on erythrocytes are called *hemolysins* and those acting on the other body cells are called *cytolysins.* The mechanism of these lytic processes is quite complex. It should also be noted in this connection that there are certain substances which kill or seriously injure bacteria and body cells and do not actually disintegrate them. Such chemical bodies are designated, respectively as *bactericidal substances* and *cytotoxins.*

The first observations in regard to bactericidal and bacteriolytic substances were made by Nuttall and later by Büchner. Büchner noted these substances in normal sera and other body fluids and named them *alexins* (Gr. to guard). He assumed that they were concerned in the immunity of the body. This is not necessarily true as certain blood sera are frequently highly bactericidal and the individual is relatively susceptible. This is true of human blood serum and *B. typhosus*. Furthermore, in certain instances the animal is immune to the disease and the serum is not in any sense bactericidal. This is the case with the dog and *Bact. anthracis*.

Pfeiffer a number of years ago observed that when *Msp. comma* of Asiatic cholera, was introduced into the peritoneal cavity of the normal guinea pig that the bacteria underwent lysis. He also noted that the process was much more rapid in the immune guinea pig. Pfeiffer had the idea in the beginning that lysis did not take place anywhere but in the body of the animal but later it was demonstrated by a number of men, among them Metchnikoff, that the lytic action would also take place in the test tube (*in vitro*).

Bordét and others later showed that some normal serums possess the power of liberating the hemoglobin in red blood corpuscles. It was also shown that these hemolytic substances could be developed in the body of an animal if that animal were injected or immunized with a suspension of erythrocytes. The phenomena of hemolysis is easily observed and studied and the amount of the hemolytic agent can be accurately determined as the amount of hemoglobin liberated varies accordingly. The mechanism of hemolysis and bacteriolysis correspond exactly and accordingly much about the latter process was first worked out by experimentation with hemolysins.

Lytic substances can be prepared for a large number of bacteria and for many body cells, as before stated. These substances may be markedly increased by the usual processes of immunization. These substances which have the power to produce lysins are called *lysinogens* and are distinct antigens. The lysins are antibodies. The lysins may be prepared by injecting the experimental animal with the live cells, the dead cells, the disintegration products of cells and in some cases with the metabolic products of cells.

The Structure of Lysins. Lysins and bactericidal substances have been shown to be composed of two distinct parts: one a thermolabile part, konwn as the *complement,* which is destroyed at a temperature of 55° C. to 60° C. for thirty minutes, and another part which is thermostable, known, on account of its double combining ability, as an *amboceptor*. This amboceptor will withstand heating to 60° C. for twenty-four hours but if the temperature is raised to 70°

C. it is readily destroyed. If kept at ordinary room temperature or in the ice box, amboceptors will remain active for years. According to Ehrlich, amboceptors are the free chemical receptors of the body cells. They are produced in the same way as antitoxins but differ from these bodies in that they have two combining groups, one known as the *cytophile* group in which the amboceptor combines with the bacteria or other cells, and the other known as the *complementophile* group, in which it combines with the complement. The complement seems to be a normal constituent of the blood serum and other body fluids. It is undoubtedly produced by the various body cells (leucocytes et. al.) and during the immunization of animals with certain antigens it is probably increased only slightly, if any, in amount. The complement is supposed to be composed of two groups also, one a haptophore in which it combines with the amboceptor and another a zymophore which readily produces the lytic action after the haptophore has combined with the amboceptor. On heating the complement the zymophore group is destroyed and a *complementoid* is produced. This substance is similar to a toxoid and will combine with the amboceptor but no lysis will result. It is, however, the amboceptor, or so-called immune body, that undergoes the decided increase during the processes of immunization. It can be accurately demonstrated that the amboceptor must combine with the cell in question before the complement can combine. Cells, such as bacteria or erythrocytes, may be saturated with the amboceptor and washed and when the complement is added and combined, lysis takes place. The ocmplement will not combine with the cells under any circumstances unless the amboceptor is present and has first combined with the cells. It is probable that in a given serum or body fluid there are several complements which may activate a variety of amboceptors. However, it has been shown that the same complement will activate a variety of amboceptors of certain kinds.

While the majority of lytic serums are thermolabile some have been noted which are thermostable to a certain degree. Hamilton has described such a serum after immunizing animals to *Bact. pseudodiphtheriae* and Horton has noted thermostable substances in normal rat serum which are lytic for *Bact. anthracis.*

Various serums have been noted which possess amboceptors for certain cells but are not lytic because they do not possess the necessary complement. For example, the serum of the dog contains amboceptors for *Bact. anthracis* but no complement. If in this instance a foreign complement such as that in guinea pig or rabbit serum is added there will be lysis of the bacterial cells.

Occasionally the absence of complement is of benefit to the animal in question and may account for the seeming natural immunity. For example, the venoms of the poisonous snakes are nothing more than amboceptors and when these substances are injected into an animal body such as a hog, which does not possess the required complement, no lysis of the body cells takes place. On the other hand should the animal, such as a rabbit or man, possess the necessary complement, as they do, lysis will take place.

Substances are sometimes present normally in serums which have the power of combining with the amboceptors which may be present, and prevent the latter from combining with the cells so that when the complement is added there will be no lysis. Such substances must be designated as *antiamboceptors.* These antiamboceptors (*antiantibodies*) may be developed in an animal by immunization with amboceptors of definite kinds. There are other substances which may also engage the amboceptors which cannot be called amboceptors in the true sense, but they accomplish the same purpose and are therefore classed with these bodies.

The Deviation of the Complement. The complement may be deviated in several ways and as a result lysis of the cells in question may be prevented.

Occasionally there is noted in serums, normally, substances which may combine with the complement and prevent this body from combining with the amboceptor. Such substances are called *anticomplements* and may be produced artificially by the immunization of animals with complement. Occasionally complement is absorbed by tissue cells and prevented from combining with the amboceptor. In case there is an excess of amboceptors in a serum and only a small amount of complement, it may be deviated. In this case the cells will have taken up all the possible amboceptors and there will be an abundance of amboceptors free in the serum. It has been demonstrated that the complement will combine with the free amboceptor before it will combine with the amboceptor which has been bound to the cells. In this case all the available complement will be taken up by the amboceptor which is free and consequently there will be no lysis. This fact is of importance in certain infections where the development of bacteriolytic substances are of importance and necessary in effecting a recovery. The infectious microörganisms may not be destroyed for the above reason.

The Deflection of the Complement as a Test for Antibodies. A very ingenious procedure has been devised for the testing of sera for unknown antibodies similar to bactericidal substances and lysins. The method of demonstrating the fixation of the complement was first worked out by Bodét and Gengou. The reaction is made use of in the test for syphilis which is briefly stated as follows: When the syphilitic antigen is combined wth the supposed amboceptor in the blood serum of the suspected case of syphilis and a foreign complement, which has been accurately standardized, is added, this complement is bound and is, therefore, prevented from combining with red blood corpuscles, and a hemolytic amboceptor which may be added later. Hemolysis is, therefore, prevented. The technique of the test as follows: The syphilitic antigen is prepared by making an adequate or alcoholic extract of the liver of syphilitic fetus or in several other ways. This antigen is supposed to contain the protein products of the *Treponema pallidum,* the etiological microörganism of syphilis. The blood serum of the suspected case of syphilis is heated to 56° C. for thirty minutes in order that the normal or immune serum complement may be destroyed. The new complement is supplied from normal guinea pig serum. Before beginning the test it is necessary to have a rabbit immunized with some hemolytic antigen, such as sheep erythrocytes. There is developed in the serum of the rabbit the hemolysin for sheep corpuscles which when combined with these corpuscles will cause a liberation of hemoglobin. In the rabbit serum there are both hemolytic amboceptors and complement. It is necessary to heat this hemolytic rabbit serum to 56° C for thirty minutes in order to destroy its complement and also it is necessary to accurately find out the amount of guinea pig serum which will complement the resulting hemolytic amboceptor. This definite amount of complement having been determined, it is mixed with syphilitic antigen plus the syphilitic amboceptor, mentioned above, and allowed to incubate for one hour and thirty minutes at 37° C. If the serum is from a case of syphilis the antibodies (amboceptors) will be present and combine with the antigen, and also the guinea pig serum complement. The next step in the technique is to add to the above mentioned mixture the hemolytic amboceptor and its antigen, sheep corpuscles. If the complement has been bound there will be none left to combine with the hemolytic amboceptor and no hemolysis of the sheep corpuscles will result. If the patient's serum does not contain syphilitic amboceptors or antibodies, the complement will not be bound and hemolysis will result. This test has been designated as the *Wassermann test* on account of the man first working it out in the case of syphilis, and has shown itself to be very efficient in the diagnosis of this disease in suspected cases.

The fixation of the complement may be made use of in the detection of any bacterial antibody, the procedure being approximately the same as above indicated and the hemolytic system used as an indicator as in the case of syphilis. The antigen, however, is different. When working with specific bacteria a suspension of bacterial cells in 0.85 per cent sodium chloride solution constitutes the antigen.

Cytotoxins and Cytolysins. The names *cytotoxin* and *cytolysin* are used synonymously and are applied to those substances in sera and other body fluids which have the power of destroying cells other than erythrocytes. In a broad sense any substance destroying a cell would be cytoxic but the terms are usually applied in the more limited manner, as above indicated.

Cytotoxins are produced in the same manner as other antibodies. The immunization of an animal, for example, with renal (kidney) cells, produces in the blood serum of that animal a cytotoxin for the parenchymatous cells of the kidney. Cytotoxins can be produced for practically all the parenchymatous cells of the body. These immune bodies are not very specific and even careful experimentation leads to confusing results. For example, when an animal is immunized to kidney cells there is produced in the body of the immune animal cytotoxins for kidney cells and also cytotoxins in smaller amounts for other parenchymatous cells such as those of the liver. In the beginning it was supposed that the cytotoxins would be of value in the study of the physiological functions of organs and tissues. For example, a cytotoxin having been produced for the thyroid gland or adrenal gland it would be possible to inject this into another animal, destroy the gland, and then note the effect on the body. It was thought it might be possible to produce anticytotoxins which would be able to counteract the action of those cytotoxic substances which are produced in the body during the course of infections. However, the lack of specificity of the cytotoxin renders these procedures only theoretically possible. The fact that cytotoxins are produced for cells other than those used in the process of immunization indicates that there are similar chemical substances in the various cells.

There are *autocytotoxins* produced in the body and these probably result from the absorption of the products of disintegrated tissue cells. If no *anticytotoxins* for these autocytotoxins are produced, or they are destroyed in some way, a very "vicious cycle" would result, in that more of the specific cells of the organ or tissue used would be destroyed. Cytotoxins have been prepared for leucocytes and these substances are somtimes developed during the progress of an infection. The *leucocytotoxins* have perhaps been studied more than any one of others.

When ova are used for the purpose of producing cytotoxins, besides producing these substances in the serum of the immune animal, cytotoxins for spermatozoa of the same species are also produced, showing that these cells have some chemical substances in common.

Metchnikoff, following his idea that old age is due to a destruction of tissue by the mononuclear leucocytes, hopes that it will be possible to produce a cytotoxin for these cells. It is claimed by some that there are specific substances produced by the exhaustion of certain cells, that is, a toxin of fatigue. Weichardt has produced an antibody for this toxic substance which must in reality be an anticytotoxin.

It has been suggested that the cardiac hypertrophy in nephritis is due to the effect of a nephrocytotoxin on the preipheral blood vessels causing increased diastolic pressure on the heart.

Another interesting substance has been produced and this is called syncytiolysin. It is prepared by immunizing animals with placental cells. It is claimed that this cytotoxin produces on injection symptoms similar to those noted in eclampsia and it has been suggested that the production of such a body in the pregnant woman from the placental cells may be the cause of this serious condition. Liepmann claims to have demonstrated placental constitutents in the blood of pregnant women by means of the precipitin test. These bodies must be the antigen of cytotoxins. He states that when the blood of the pregnant woman is mixed with the specific syncytiolysin produced by immunizing an animal with human placenta that a precipitate occurs. He suggests the possibility of a serum test for pregnancy. Abderhalden has reported some interesting results with the serum test for pregnancy and cancer. His findings cannot, however, be regarded as conclusive.

Cytotoxins are similar to bacteriolysins and hemolysins. They consist of amboceptors which are activated by the complement which is normally present in the serum or other body fluids.

(*To be continued.*)

A SURVEY OF INDUSTRIAL HEALTH-HAZARDS AND OCCUPATIONAL DISEASES IN OHIO.

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(*Continued from the March issue.*)

PART III.

FATIGUE. — Fatigue is one of the most common causes of occupational disability.* This is a prime cause of the fact that bodily development in factory classes remains inferior to that in other social classes. Fatigue is defined as loss of irritability and contractility brought on by functional activity. The sensation of fatigue is due to the accumulation of waste products within the system called fatigue poisons (definite chemical substances) and fatigue toxins. The poisons are acidic in character. A fatigued muscle is acid in reaction,

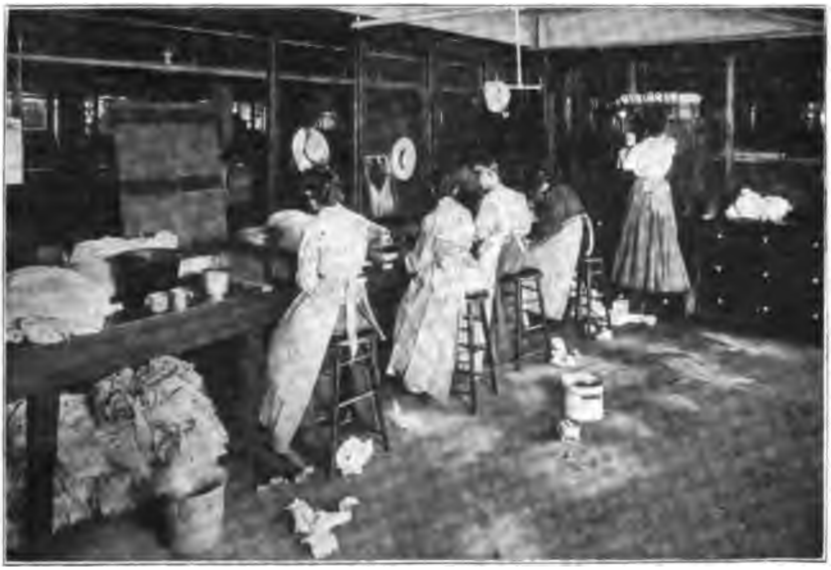

FIG. 18. SORTING AND MARKING IN A LAUNDRY.
Note stools without back rests.—A fatigue factor among sedentary workers.

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* "So tired" is an expression which should never be heard from any worker at the close of his or her work day. It signifies exhaustion. — (*Sir Thomas Oliver.*)

while one at rest is alkaline. Of the poisons, leucomaines are one type and are similar in action to ptomaines obtained from putrid meats. The presence of such substances is easily demonstrated, as for instance, in the dog experiment in which a few cubic centimeters of blood removed from the veins of a dog, which has been run until fatigued, and then injected into another dog, not previously exercised. within a few moments causes symptoms of fatigue to appear in the second animal; even paralyzing effects and, finally, death may follow after a period of extreme exhaustion. There are many other ways of demonstrating the presence of this fatigue substance. Fatigue poisons do not accumulate in the system if time intervals are sufficient for the circulation to counteract, and remove them between muscular efforts. These symptoms, when they appear, are usually not more prominent in the particular muscles or parts used than throughout the system in general. The brain, which is the source of motive power, always suffers in fatigue, no matter what part of the body is overworked.

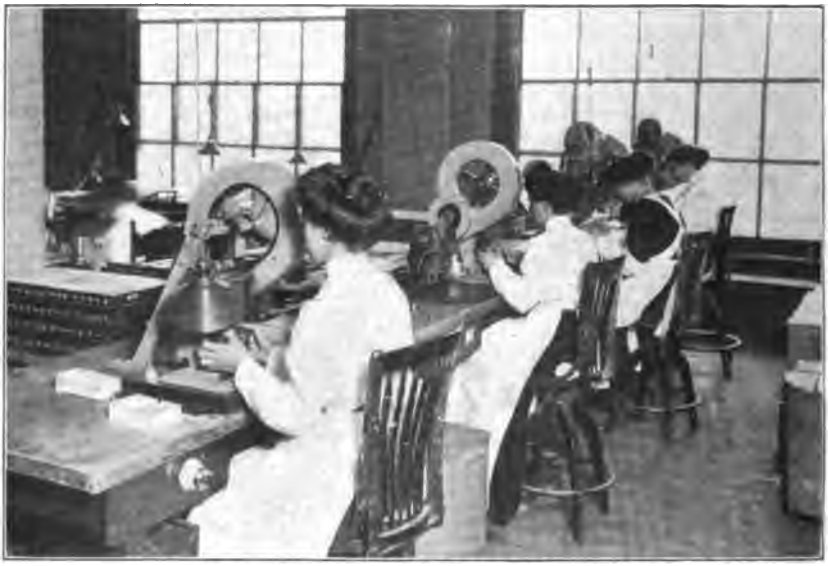

FIG. 19. IDEAL WORKING CONDITIONS.

Sedentary work showing swivel chairs with backs and foot rests. Also lamps well placed and shaded. All are important factors against fatigue. Note machine parts protected to prevent accidents.

Workers who begin a new process at first feel the symptoms of fatigue very quickly, but gradually the period of continuous application is extended until, as we have explained, the person has become used to the work. This is more than the matter of the establishment of a good circulation of blood to the parts used, and the training of nerve-paths. It seems in part to be due to an anti-toxin carried within the blood which destroys the fatigue toxin at its source in the muscle. "Getting in training" is but the working up of this fatigue antitoxin.

Fatigue symptoms should never be permitted to exist in industries. These are, in a minor way, tiredness, sore muscles, stiff joints, aches and pains, etc., while in a more severe form we have such signs as muscular cramps, obstinate lumbago, wry neck, neuritis, neuralgia, and "occupational neuroses", in which any attempt to return to the regular work results in spasms of the muscles used, accompanied by soreness, constant aches and pains, trembling, gradual emaciation and partial paralysis of the parts. In time, ligaments weaken so that flat feet occur (perhaps with varicose veins, eczema and ulcers), round shoulders, bowed backs, and sunken necks. Internal organs drop downward (especially the kidneys and the female organs), causing much chronic invalidism. Such signs are usually accompanied with a mental condition of anxiety which is out of all apparent proportions to what can be seen, and along with headache and constipation make up the disease condition known as "neurasthenia." Neurasthenia is practically always occupational. In females "hysteria" is a frequent associate. The next stage is "nervous breakdown". Many persons, of slightly unsound condition to begin with, develop a "fatigue psychosis", that is, insanity which may be sudden and violent, or just a gradual deterioration characterized as "played out", "no good any more". "can't make his day's wages", etc. Our hospitals, dispensaries, charities, various institutions and asylums are crowded full of these classes of persons. About 90% of them are over 40 years of age, which make a significant contrast with the age-group figures for wage-earners in manufacturing industries, about 90% of whom appear to be under 40 years of age.

Fatigue which affects the steady worker causes anemia, enlargement of the heart, increased blood pressure, circulatory diseases, kidney disease, and neurasthenia or nervous exhaustion. This latter is a very common complaint of the working classes. Chronic fatigue predisposes to weakness and paralysis of special parts, and to nervous breakdowns. The general fibrosis of all organs and parts encroaches upon the reserve forces of these organs and parts. Premature old age is a consequence. During the course of any of these chronic affections, which are usually progressive when once incited, the person is predisposed to all manner of acute diseases, one of which, in the end, is finally signed upon the death certificate as the cause of demise.

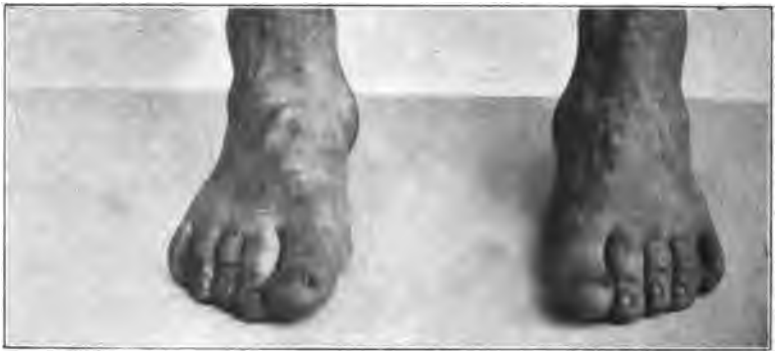

Fig. 20. The Normal Position of the Feet in Standing or Walking.

The toes should be pointed almost straight to the front, which gives strength to the arch of the foot, while the walker covers more ground for given muscular effort.

Loud noises fatigue the ears, and are a common cause of partial or complete deafness. Cotton stuffed in the ears during work, and removed immediately afterwards greatly limits this deafness.

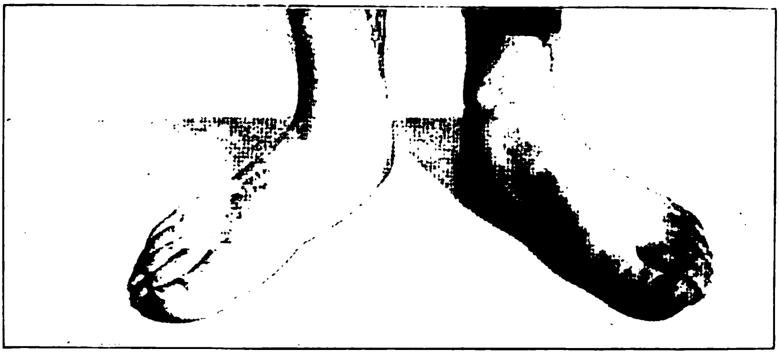

Fig. 21. Flat Feet.

This results from incorrect standing or walking, or prolonged standing (especially during youth or during a weakened condition).

Young persons, particularly those under 18 years of age, are permanently and more seriously damaged by the poisons and toxins of fatigue than are those of maturity. This is because during the age-period from about 15 to 18 in boys, and about 14 to 17 in girls, a marked increase in growth should normally take place (greater than any other period of life, except the first two years of infancy), and, there is also, not only growth in stature, but a *concrescence* or "growing together" for firm union for adult life of the muscles, bones, tendons, etc., which are concerned in voluntary acts. Furthermore, the cartilaginous parts and junctions, are, during this age, finally replaced by bony matter. During this age-period, then, energies must especially be conserved for the functions of growth. Where fatigue substances are allowed to factor, growth is stunted, concrescence is interfered with, and reserve forces so dissipated that there results deformities, weakened constitutions, and a greatly increased liability to the inception of chronic diseases, particularly of tuberculosis and organic heart disease.

The fact that young persons' fingers are nimble, and their actions quick should not be taken advantage of by allowing disastrous exhaustion to lessen their vitality at this most important period of life. Particularly does this apply to the permitting of piece-work, and monotonous or steady-straining processes. Also to night work, and to weekly alternation between night work and day work. If we add to these deleterious fatigue toxins the poisons which are produced by exposure to heat, the disastrous results are usually more than double. Any who doubt this may consult the Vital Statistics Reports.

In a word, fatigue, or a tired feeling, means for all persons: Take a rest! The sensation is simply nature's warning. Rest, at least during the daytime, very rarely implies a cessation of voluntary activities altogether, but implies a change of work or process for a brief interval, by which strain is relieved and recreation is brought about. The entire cessation of voluntary activities, which normally occurs in the adult for a period of about eight hours during the night, is essential for the recreation of the vital organs, which, though in constant activity from the day of birth until the day of death, require about one-third of the time each twenty-four hours to compensate for the extra duties imposed upon them by the acts of voluntary activity.

In summing up the chief factors which cause fatigue in the steady workers — who, as we have shown above, should never show symptoms of exhaustion — there are (1) laborious work, (2) long hours, (3) piece-work, (4) speeding up, (5) monotony, (6) constant standing. (Constant standing upon cement, stone or brick floors should be provided against by supplying wood platforms or even plain boards upon which to stand. Correct methods of standing — the toes and heels parallel — should be taught). (7) constant strain, (8) chairs or stools without backs, (9) faulty postures, (10) jarring processes, (11) pressing or holding objects against the body, (12) eyestrain, (13) loud noises, (14) irregular hours for sleep, and finally, (15) the *absence of work variation* or periods of relaxation and recreation, which, in case of females, means, also, rest rooms.

INACTIVITY. — For a period of about 15 to 16 hours of the day, the average normal adult may remain awake and exercise for the most of the time his physical and mental equipments, provided there is diversity of application. This is essential to keep these parts in normal tone, but more especially to aid in the circulation of the blood and lymph, so that food products are properly assimilated, and waste products are properly eliminated. If such opportunity for exercising the voluntary functions is not given, there is a tendency for assimilating powers and processes, to surpass the powers of distribution and elimination. In common parlance this "sluggishness" produces self-poisoning. In reality gouty and other poisons accumulate, and produce damage to blood vessels and organs, not very dissimilar to the effects of fatigue-poisons.

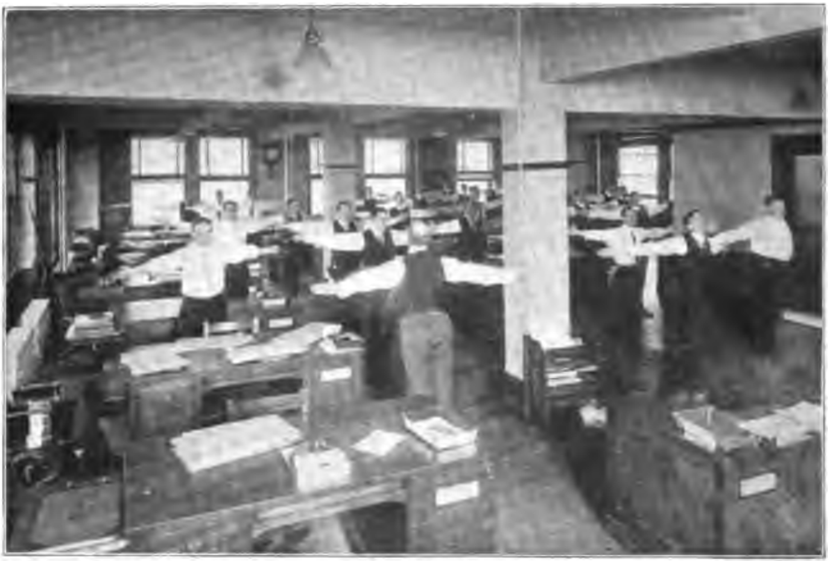

FIG. 22. EXERCISE FOR THE OFFICE FORCE.

Once in the morning and once in the afternoon. A great stimulant for all inactive workers.

Those persons who do sedentary work, whether at desks, at machines, or at benches all day, are, in a way, doubly poisoning themselves, first, through fatigue-poisons, due to the over-use of certain

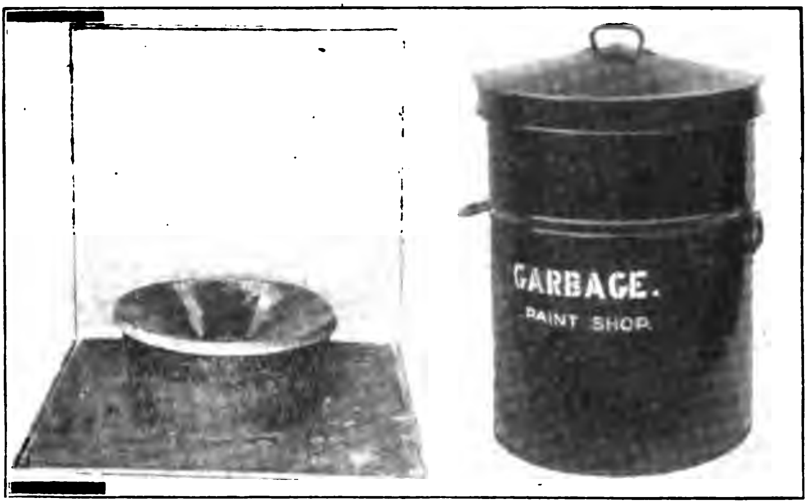

FIG. 23. TWO HEALTH PROTECTORS IN FACTORY LIFE.

The model cuspidor for factory use, showing "backstop" and floor protector, all easily cleaned. The garbage can is a sentinel for order and cleanliness.

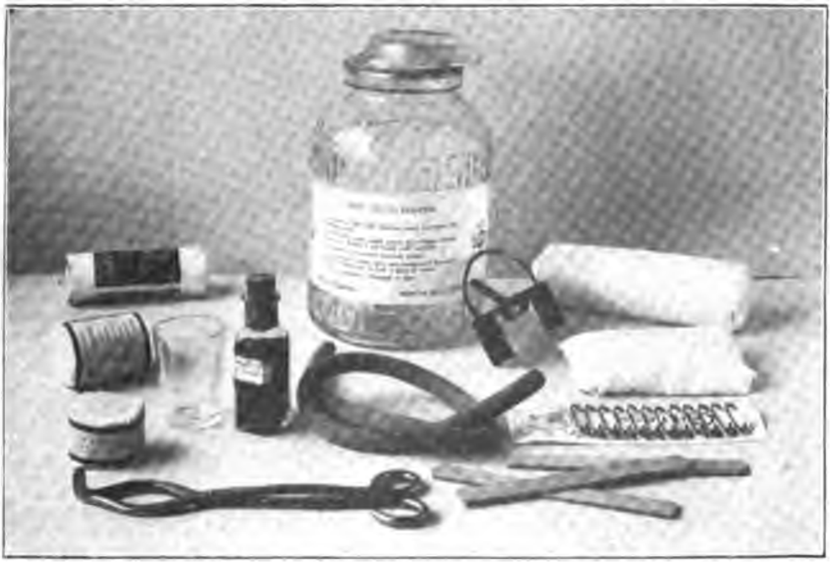

FIG. 24. FIRST-AID KIT.

Each department of the plant should be supplied with a "First-Aid in Case of Accident" kit, which is conveniently kept in a glass jar.

parts without rest intervals, and secondly, to the accumulation of poisons from a sluggish circulation due to general muscular and respiratory inactivity. Where monotony in work is a factor, it is physiologically necessary that workers be taught, and allowed to work at at least two different processes. *Frequent physical exercise is necessary to maintain health.*

GERMS AND INFECTION.—Vast numbers of persons are exposed through methods and environments of work to infections, blood poisonings and communicable diseases. In the first place, (1) over-crowding in workshops enhances the spread of all communicable diseases. (2) the common use of towels, cups, wash basins, clothes, etc., spreads diphtheria, colds, tonsilitis, pneumonia, consumption, syphilis, trachoma (granulated eyelids), and any of the more strictly contagious diseases.

Other sources of industrial infections are (3) improper closets, (4) spitting upon the floors, (5) sweeping during work hours, or by dry methods, (6) absence of cuspidors, (7) the handling of infectious materials (hides, wiping rags, wool, oil, etc.), (8) the handling or mouthing of articles just previously handled or mouthed by another person, etc.

Infections are also invited through (9) frequent trivial injuries, (10) flying particles, (11) cracking or fissuring of the skin, eczemas, etc., due to the careless use of solutions, gases and vapors. Also (12) through calluses, which, when incised or punctured, as by slivers, etc., have very poor resistance to infection and subsequent blood poisoning, and to lock-jaw; hence, in this connection, the great value of "first-aid" to take care of the most trivial injuries, foreign particles in the eyes, etc., and (13) a surgical emergency room. and. for larger establishments, the presence of (14) a trained nurse, (15) a supervising physician and surgeon, and (16) hospital arrangements.

Smallpox, plague and other diseases have been spread by (17) the use of wiping rags, waste, etc., which, unsterilized, have come from almost anywhere. (18) Typhoid fever has proved a menace to thousands of workers in this state; in one place where strikebreakers were confined behind factory enclosures without proper sanitary arrangements; in another where the offal from a quarry district, which was almost without sanitary provisions, eventually polluted the water supply; etc. Trachoma has proven a serious menace to factory districts, mostly (19) through housing conditions, and the question at once arises whether employers have not a right to demand certain standards in this direction, in return for the value of the money which is paid in wages.

Hookworm disease is liable to develop (20) among miners, tunnel workers, brick makers, quarrymen, construction-camp workers, lumber and saw-mill hands, where no closets or privies are provided, and especially in seasons of the year which permit persons to wear open or "holey" shoes, or go barefooted, or handle the earth directly. Obviously, typhoid fever is constantly to be feared under such conditions, with the added risk which contaminated water gives. Workers about animals (21) are liable to anthrax, glanders, cow-pox, milk sickness, lumpy jaw, hoof-and-mouth disease, catarrhal jaundice (Weil's disease), pemphigus, erysipelas and lock-jaw.

FIG. 25. NEEDED IN ALL WORK PLACES.

Emergency equipment for first-aid to the injured. Prevents blood poisoning.

A *medical supervision* of workers in all places employing persons working in close quarters is essential. It will prevent much "industrial" tuberculosis. This should include (22) the *physical examination* of new employes, and careful thought given to the selection of workers from a health point of view. Further factors that will tend to keep down infections are the supplying of (23) gloves, (24) goggles, and (25) the posting of placards of instruction.

POISONS. — Workers in poisons are very liable to develop *specific occupational diseases* due to the particular poison to which they may be exposed. The extent to which poisons are used in the industries is enormous, and new industries utilize the same poisons in new and dangerous methods. As health-hazards, no poisons need to be dispensed with in industry, but what is necessary is that in their use as much attention be given to their effects upon health, both acute and chronic, as to the methods and purposes for which they are used.

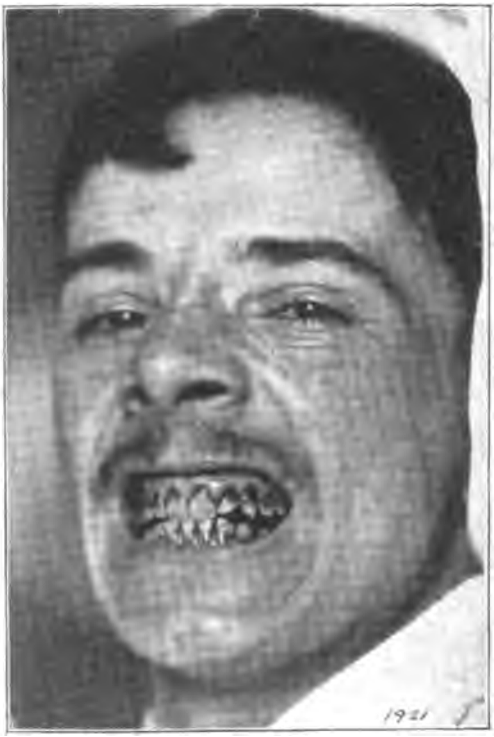

FIG. 26. LEAD POISONING.

The black line due to lead is well shown on the teeth. It was also well marked *in* the gum margins.

The more common poisons used in the State of Ohio are about in order of their frequency of use and their liability to produce occupational disease: lead, benzine and benzol (naphtha, petrol, gasoline, etc.), turpentine and similar dryers, brass or zinc in the form of fumes; acids, alkalis, wood alcohol, analin oil, carbon bisulphide, antimony, illuminating and fuel gas, sulphurated hydrogen, arsenic, phosphorus and mercury. (The State Board of Health has a special pamphlet entitled "Industrial Poisons" which covers all of these poisons and many more. After naming and describing the poisons, the industries in which each is commonly used are given, and, finally, a concise description of the symptoms produced, as well as methods of preventing and treating such cases of poisoning.)

Occupational poisonings occur because the amount of risk is not appreciated by either employer or employe. Also, because of the physiologically impossible assumption that a person can "get used to" a poison. No metallic or inorganic poison can be absorbed in the human system without evidences of damage resulting. In fact, in this respect, arsenic and phosphorus are apparently the least harmful of all because they have, to a limited extent, alterative powers, if assimilated in very minute quantities. Even this much cannot be said for any of the other poisons mentioned in the above list. None can be physiologically handled by the human body. *Their presence in the body is incompatible with the maintenance of health.*

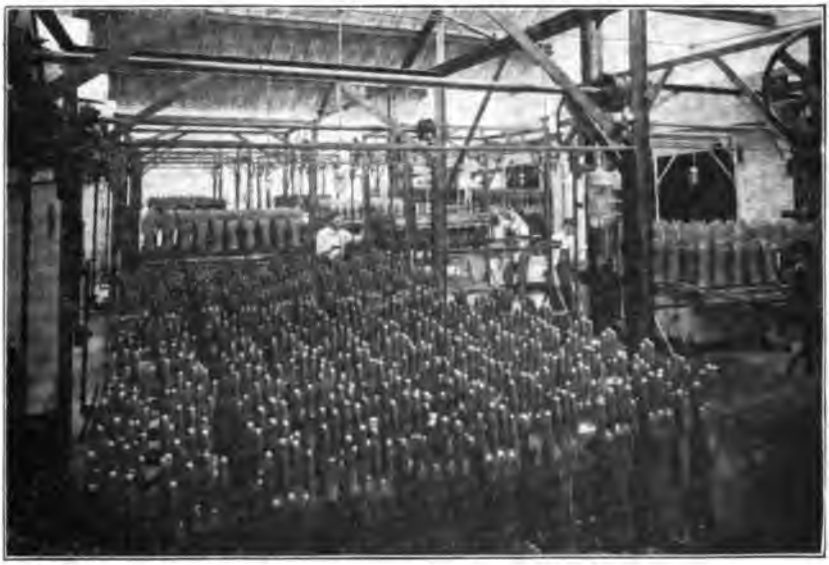

FIG. 29. MAKING RUBBER GLOVES.

Dipping Room. Benzine vats are covered between operations. Floor is exhaust-vented and fresh air forced in continually from above.

A great mistake which is made in the conception of poisons is the question of mistaking toleration for habituation. The fallacy of this has been fully described in the beginning of this chapter. In a word, toleration at least implies utilization of reserve force, and this always results in early decrease in capacity, with gradual fibrosis of

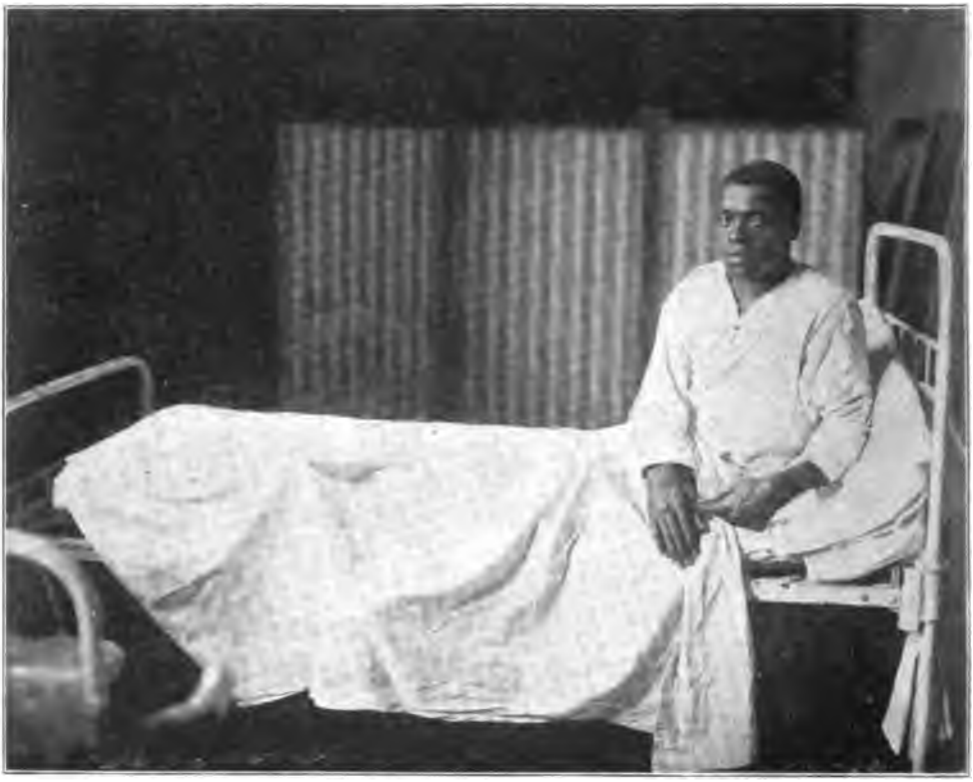

FIG. 27. PARALYSIS FROM LEAD POISONING.

This man, aged 22, a kiln room laborer in a lead-works, was admitted to Cincinnati Hospital in the Spring of 1914, with acute lead poisoning. He rapidly recovered and was strongly advised upon discharge to keep away from any occupation dealing with lead. In spite of this he returned to his former work. After 6 weeks he returned to the Hospital (June 6, 1914) again suffering from lead poisoning and paraylsis of both wrists.

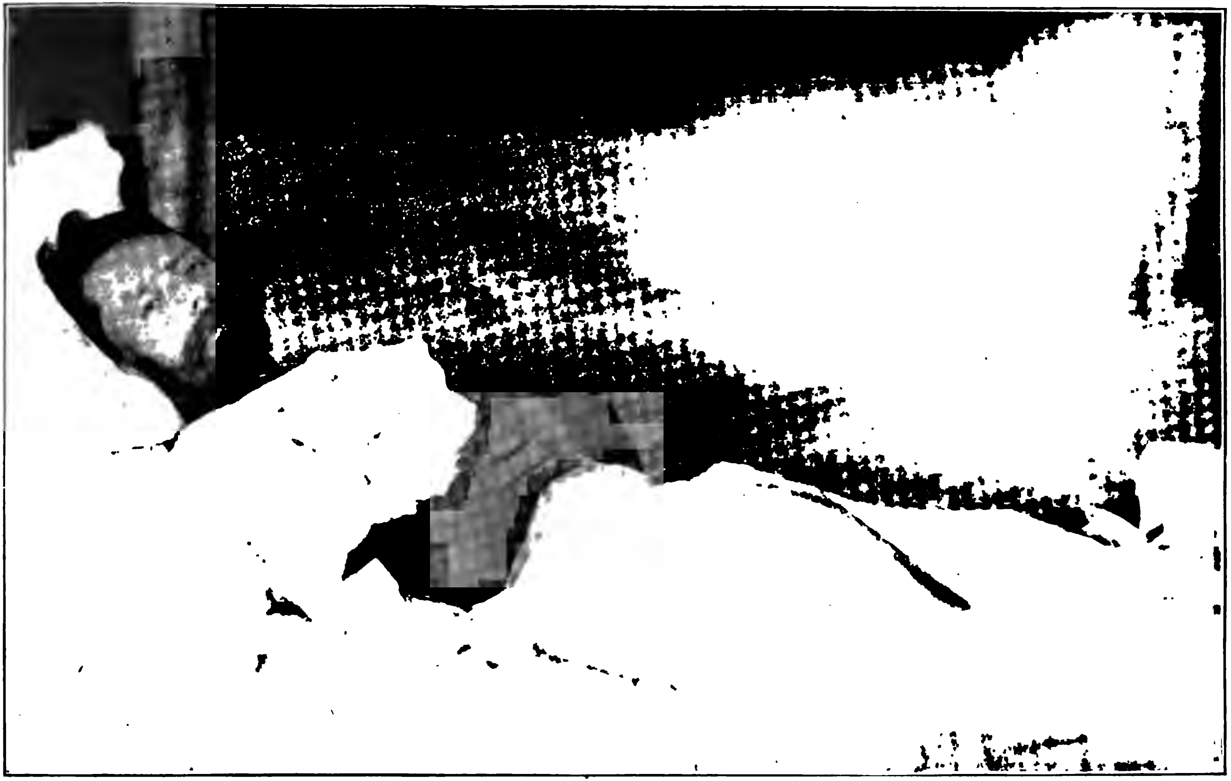

FIG. 25. DEATH FROM LEAD POISONING.

This man, aged 51, worked about one month as a lead-work's laborer in Cincinnati and was admitted on May 22, 1914, to the Cincinnati Hospital suffering from acute lead poisoning. He soon became delirious and violent and had to be shackled to his bed. He died in the hospital, June 23, 1914, his death certificate giving the cause of death as "Lead Encephalitis, Chronic Nephritis".

the organs and parts, similar to that seen in old age. In addition to fibrosis, poisons invariably cause protoplasmic changes of destructive character in the vital organs.

Occupational poisonings will not cease until the following factors have been met and overcome: (1) keeping workers in ignorance of poisons used, (2) misbranding of poisons, (3) fancy branding of articles containing poisons, (4) lack of instructions, (5) disregard of instructions, (6) wrongful instructions, (7) harmful regulations, (8) absence of medical supervision, (9) and of mechanical health appliances. Further, (10) the eating-at-work or in workrooms, (11) lack of personal cleanliness,—even the wearing of mustaches or beards are vital factors with some poisons. Finally, there must be considered, for given poisons, the use of (12) gloves, (13) respirators, (14) proper clothes, (15) lockers in outside rooms, (16) good washing facilities, (17) water closets, (18) eating places, and the develop-

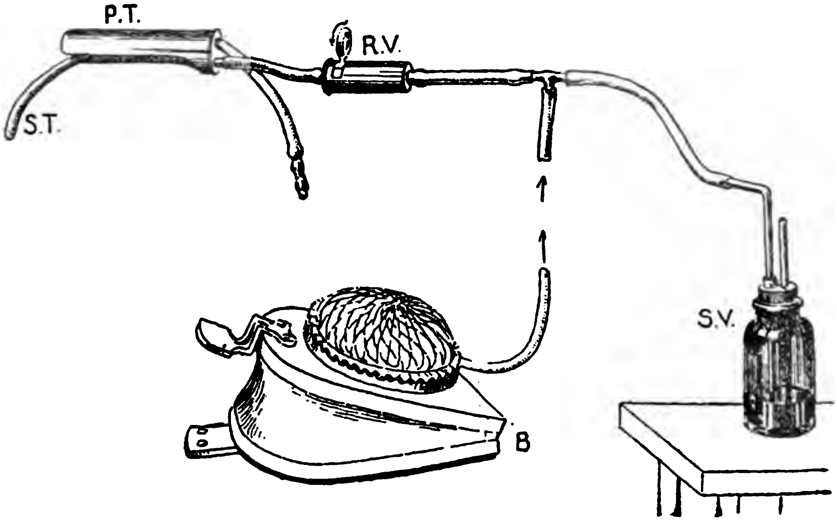

FIG. 30. THE MELTZER ARTIFICIAL RESPIRATION APPARATUS.

(Recommended by the Committee on Resuscitation from Mine Gases of the U. S. Bureau of Mines which disapproved of the pulmotor and other apparatus. *See* Technical Paper 77, U. S. Bureau of Mines).

The pharyngeal tube method. P. T., pharyngeal tube; R. V., respiratory valve; turning to the right brings an inspiration and to the left an expiration; S. V., safety valve (bottle should be shorter and wider); S. T., stomach tube (this may be omitted provided sufficient pressure is made on the abdomen to prevent gaseous distension of the stomach); B., bellows, (an oxygen tank may be substituted).

ment of inventions along the lines of (19) confining poisons, and possibly of the (20) substitution of certain poisons, by non-poisonous, even though, perhaps, more expensive substances. This latter, we believe, is rarely, if ever, necessary.

One feature; if borne in mind, would do away with nine-tenths of all industrial poisoning, and would seem easy of accomplishment. This is to keep poisons from entering the system by way of the nose or mouth. The wearing of a respirator would seem to accomplish this as far as inhalation is concerned, but the question of preventing the ingress of poisons to the mouth, as from licking the lips, or using the uncleansed hands to put tobacco, or foods, or drinks into the mouth, seems to be almost impossible of accomplishment, hence the necessity of curtailing the amount of poisons by mechanical means to the utmost extent. In the end, a periodic examination of all workers in poisons is necessary in order to rid these industries of those who are unusually susceptible, or who cannot be made, or taught, to follow instructions. The rotation of workers is another admirable means of meeting the situation, but this cannot be intelligently controlled without periodic medical examinations.

There are some *further health-hazards* in industries, some of which we will briefly mention. Working in COMPRESSED AIR, that is, in caissons, is one of these. So far as we know, very little work of this character was performed in the State during the course of our survey. Suffice it to say that in bridge-building, tunneling, (particularly under water), and sometimes in the construction of buildings, it is necessary that the work be done under compressed-air. On the top, or in connection with all such caissons within which men have to work, should be provided air-locks within which workmen should be required to spend from 15 to 30 minutes at the close of each work period in order to undergo depression before coming out into the normal air-pressure, and thus prevent the formation of air bubbles (air emboli) within the blood vessels, which, being carried to the vital organs, particularly the lungs, spinal cord and the brain, produce the symptoms called "the chokes", "the bends" and "the staggers". Such symptoms often result fatally, sometimes within a few minutes.

To a certain extent FOUL ODORS may be considered health-hazards, because of the nauseating effect which they tend to produce. Nausea is usually accompanied by an excessive secretion of gastric juice, which, in time, if continued, produces mucous gastritis. The condition especially invites alcoholism, but even by itself would result in emaciation and debility through loss of appetite and of the digestive powers. However, this is one subject in which the personal factor is uppermost. What is nauseating to one may prove quite inoffensive to another. To this question of odors, workers will usually select themselves of their own accord, before any material damage is done to the system. In this connection we would mention especially the furnace odors so frequently complained of by workers around oil-blast furnaces, particularly when these are being started up as in the early morning of each day. For these persons, proper ventilation is essential.

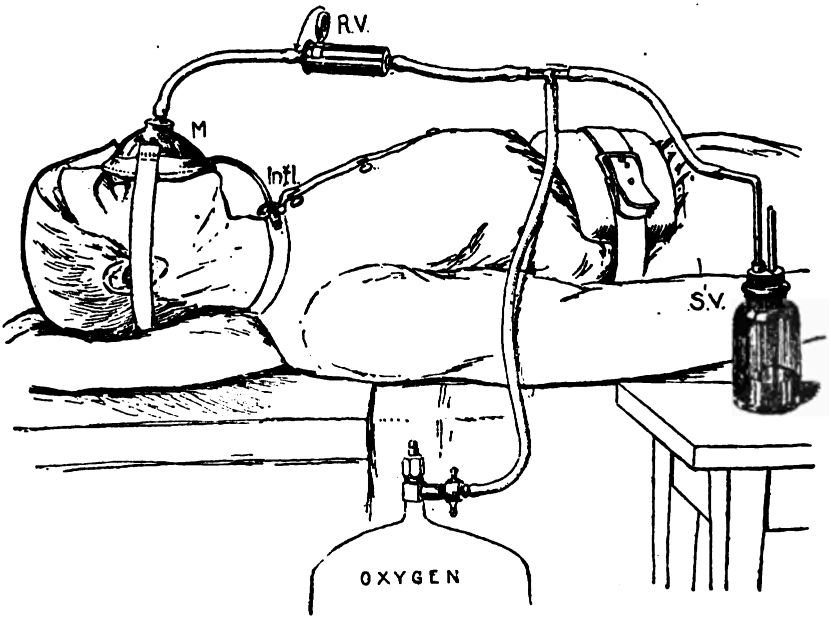

FIG. 31. THE MELTZER ARTIFICIAL RESPIRATION APPARATUS.

Face mask method. A well-fitting face mask may be used instead of the pharyngeal tube shown in figure 3. M., mask; Infl., inflation tube for inflating rubber ring around rim of mask; R. V., respiratory valve; S. V., safety valve. Insufflation pressure provided by oxygen tank. Heavy weights should be placed upon the abdomen. The pressure may be reinforced by a belt, or a belt pressing downward on a broad board may replace the weight. The belt alone is insufficient. The tongue should be pulled well forward by means of a proper tongue forceps.

Oftentimes indoor closets are installed in workrooms, without proper ventilation arrangements, perhaps only partially partitioned off with no ceiling over the same, so that odors escape and permeate the workroom. Some of the loudest complaints of the work people have been in connection with this type of an indoor closet. If much used, it is a constant source of irritation to the workers and productive of much bad feeling towards managements.

The acquisition of VENEREAL DISEASES through industry is possible through the common handling or mouthing of articles; through a lack of supervision where both sexes work together; and, through the unmindfulness of employers of generally immoral surroundings, such, for instance, as are created by questionable pictures, "wall writings',, loose language, etc.

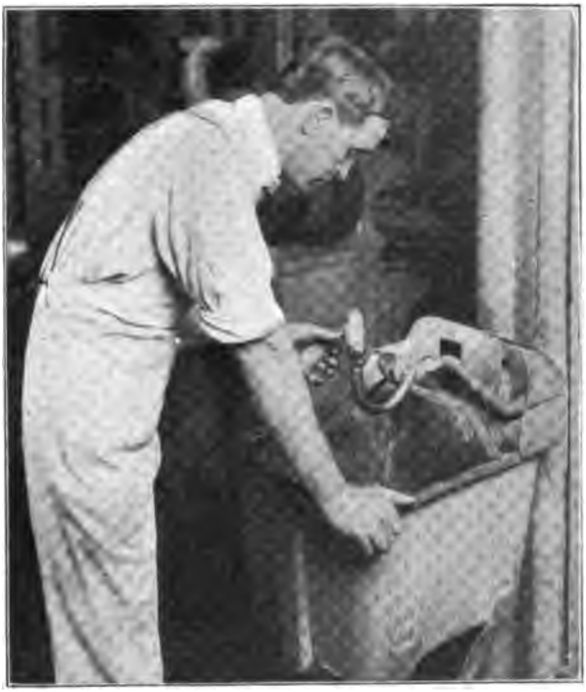

FIG. 32. SANITARY DRINKING FOUNTAINS.

Plenty of good water, properly cooled, in the workplace tends to limit alcoholism outside of the workplace.

The subject of ALCOHOLISM, as an industrial health-hazard, both as cause and effect, has been discussed in an early part of this section under the head of "Stimulantism."

(To be continued.)

GENERAL PROCESSES.

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(Continued from the March issue.)

MACHINE SHOPPING.

The process of Machine Shopping includes a considerable number of sub-processes and operations upon cast metals. These consist, principally, in turning, lathing, planing, drill-pressing, punch-pressing, threading, tapping, cold riveting, sawing, cutting, assembling, and the like. All of these processes are characterized by the fact that they are not carried on ordinarily with the aid of heat, nor is there much necessary creation of fine dust. The workers usually are more or less skilled. (Strictly routine machine operations carried on as piece-work by unskilled laborers have been considered mostly as General Factory Processes.)

Machine Shopping was especially investigated in a total of 56 plants, located in 8 cities, and employing 4,082 wage-earners, of whom 3,897 were males, and 185 (engaged in 2 factories), were females. These latter were working upon machines which threaded bolts, nuts, etc.

The process was investigated in connection with the following industries, arranged in descending order: Foundry and Machine Shop Products, 16; Cutlery and Tools, 13; Automobiles and Parts, 6; Brass and Bronze Products, 4; Electrical Apparatus, 3; Agricultural Implements, 2; Springs, 2; and 1 each of the following: Cars; Coffins, Copper and Tin; Files; Furniture; Shipbuilding; Stoves; Bolts and Nuts; Scales and Balances; Stamps and Stencils; and Iron and Steel Forgings.

Mortality Statistics for Machinists have been stated in Part IV., under Foundry and Machine Shop Products.

Only one plant visited was a union shop, the balance being "open shop". The employers' interest in the workers' welfare appeared very good in 42 places, fair in 7 more, bad in 3 (and not reported upon in the remaining 4). In some 14 plants a good percentage of ignorant workers were employed in various helping and routine processes. Retention of workers at the places employed seemed to be good in all except 4 instances. Usually, special health appliances for machine shop processes are not needed. Safety devices were almost everywhere present. In 6 plants excellent arrangements were found for general room ventilation. Organized instructions along health lines were given in 7 places, and some attention to this in 1 or 2 more. The workers had sick benefit privileges in factory organizations in 6 instances, although in 2 of these only a part were covered. The general construction of machine shop quarters was good in 35 places, fair in 6, and bad in 10 (the remaining 5 not being reported upon). In 22 places, other processes were at hand, such as Metal Grinding, Polishing, Tempering, Wood Working, Painting, Welding, Blacksmithing etc.

Age group estimations summed up as follows:

Age Groups.	*Number of Wage-earners*
Over 50 years	75
45 to 50	271
40 to 45	491
Under 40	3,245

Dust was no hazard in 35 places, and in but 3 was it marked enough to demand attention and here it was due to other processes (grinding, polishing). Thirty-two places were kept very *clean* and orderly, 10 more fairly so, and the remaining 14 not so. Cuspidors and refuse cans were present more often in machine shops than most other places investigated. Dry sweeping during work hours was occasionally observed. In 5 places quarters were rather *damp,* due to location, and, occasionally, wet grinding. Natural *light* was good in 46 places, fair in 5 more, and poor in the remaining 5. In a considerable number of places artificial lighting was done chiefly with naked electric lamps, suspended overhead, and often very inefficient as regarded general room illumination. In 1 place mercury arcs were used for lighting. The *air* condition of the various machine shop processes seemed good in 41 places, fair in 12 others, and poor in only 3. This high percentage of good air condition is due to the

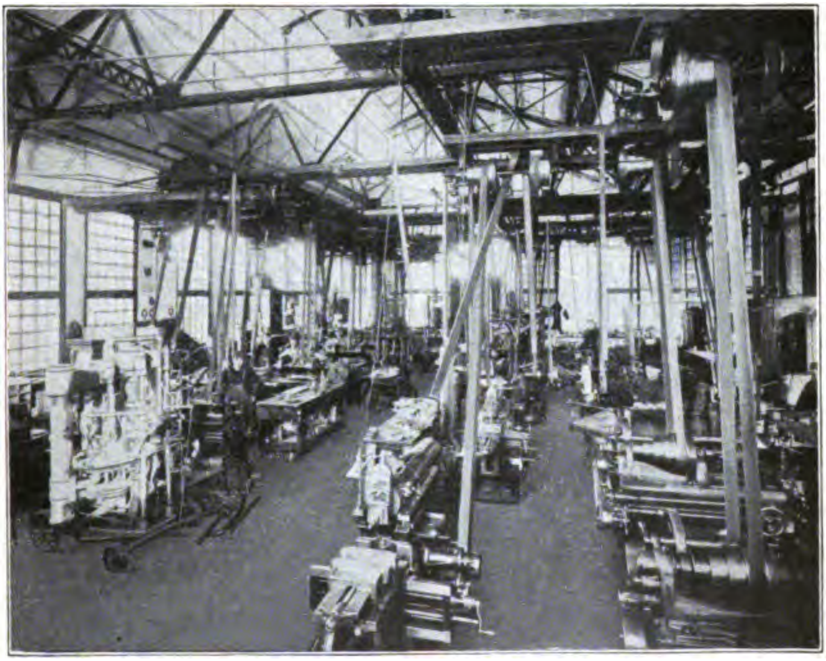

FIG. 42. A MODEL MACHINE SHOP.
Maintained by a glass factory.

usually spacious quarters, and the absence of industrial factors in the process to contaminate it. *Fatigue,* in the general routine of machine shop work, is a negligible factor, but a good percentage of the employes were found to be subjected to various hazards as follows: hurrying piece-work, 14; excessive noise, 12; constant standing still, 8; monotonous application, 3; while sedentary processes on chairs or stools without backs, faulty postures, jarring processes, (pneumatic tools, drop presses, etc.) and prolonged pressing of objects against the person were observed in many manipulations. The workday was found to be from 9 to 10 hours in all except one place, where it was 10¼. Saturday afternoons were about evenly "off" and "on". The noon recess was 1 hour in 1 place, ¾ hour in 48 places, ½ hour in 2, and not determined in the remaining 1. The liability to the contraction of *communicable diseases* was considerable in 6 places, fair in 21 more, and questionably negligible in the remaining. The chief factors, where present, were the use of common drinking cups, poor closets and washing facilities, and promiscuous spitting. The oil-soaked floors and lack of dust, however, in a great majority of places, rendered the hazard less likely. Another hazard observed was the likelihood of infections from the use of wiping rags and waste from any and all sources. Particularly should be mentioned here virulent pus infections (blood poisoning), erysipelas, lockjaw, as well as the problematical acquisition of contagions, such as smallpox, diphtheria, measles, tuberculosis, and other communicable diseases like typhoid fever. Our attention was called in 1 place to the fact that tubercle bacilli had been isolated from the oil used in screw machines, evidently due to the fact that workmen spit into it during its flow through the machines. It was found that the "safety first" idea had spread the principles of "first aid" in preventing infections in a number of places. The only *poisons* encountered in machine shopping were occasional exposures to lead (in tempering, soldering, in rich lead alloys worked upon), benzine, paint solutions, and brass. Occasionally forge gases and potassium cyanide tempering or case-hardening were carried on. The industrial inducement to *alcoholism* and stimulantism was considered a fairly negligible factor in almost all places. Where present, such was due to fatigue factors, the absence of good thirst-assuaging facilities, and the depressing influence of general insanitary conditions.

The general *appearance* from a health point of view of the mass of workers in this process was good in 43 places, fair in 8 more, and not good in the remaining 5 — the latter including some large places where a poor class of help and females were employed. The *complaints* which workers made were localized to certain insanitary conditions in their own plants. Our investigators came across 2 cases of open consumption, and here and there skin afflictions, such as "brass rash" and certain numbers of pale, anemic and unhealthy looking workers. *Comments.* — The reduction of certain monotonous and hurrying piece-work operations for workers in some plants, and attention to general sanitary and hygienic features are the suggestions offered. The more general use of goggles, gloves, cotton in the ears for noise, and first-aid equipment is needed in many places. Obviously, the presence of other noxious processes should be separated from that of machine shopping.

BOILER MAKING is a procedure in which at least two hazards were found to exist: excessive noise of a reverberating character, producing in practically all workers deafness usually of considerable extent; and heat, where workers were in confined spaces during the process of hot riveting.

Riveting is a process in which excessive noise is produced, which is considerably worse if in confined quarters. Workers who handle pneumatic riveters have the same hazard to the muscular and nervous systems as do all workers using these vibrating types of tools. "Occupational neurosis" is the term applied to the condition which develops.

TEMPERING.

The process of tempering, that is, hardening of metals and metal surfaces, was found to be carried out by several methods: simply heating and cooling, or heating and dipping into water or brine, or dipping into hot baths of lead, oil or potassium cyanide, or sprinkling on potassium cyanide and heating in an oven. Case hardening was done chiefly with potassium cyanide.

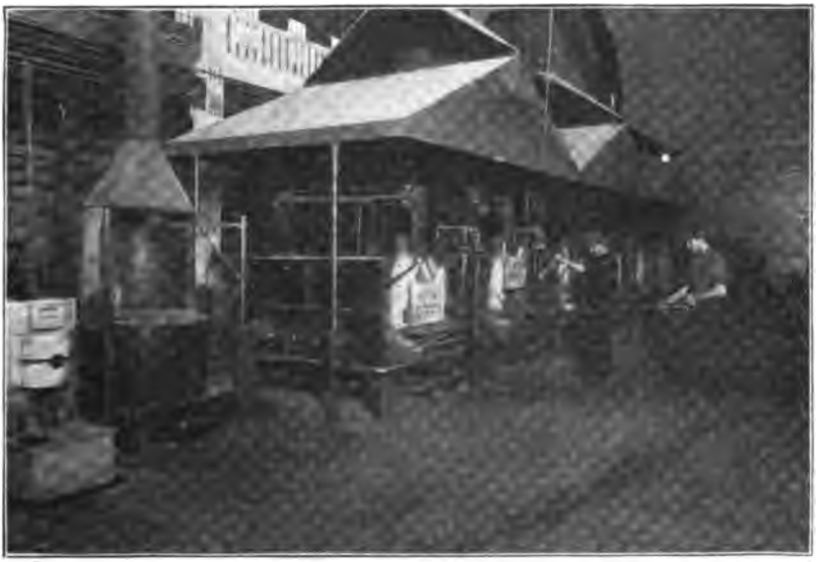

Fig. 43. Blacksmithing and Tempering.

Note ventilating hoods and stacks over furnaces. The stove-like furnace to the left is where tempering is done in molten lead or potassium cyanide.

The process was investigated in 31 establishments in 9 cities, and employed a total of 326 wage-earners, all males. It was found to be used in connection with the following industries: Cutlery and Tools; Foundry and Machine Shop Products; Springs; Automobiles and Parts; Bolts; Nuts; etc.; Electrical Apparatus; Files; Sewing Machines; Bicycles and Parts; Iron and Steel Mills; Stamps and Stencils; and Cash Registers.

Tempering was usually done in connection with the blacksmithing and forging quarters, but, occasionally, elsewhere. It required expert men for some purposes, while a considerable number of ignorant foreigners were engaged at it for other purposes. Health appliances consisting of hoods with vents (and sometimes air blasts and fans to blow back heat and fumes) were found efficient in 5 places, fairly so in 8 more, and absent in 18 (in a few of which but little tempering was done). Some instructions concerning avoidance of poisoning were given in 4 places, but in the majority of places, where the most deadly poison was used (potassium cyanide), ignorant workmen were employed in handling it. In 7 of the places visited the workers had the privilege of sick benefit associations. In 9 of the 31 places, other processes were conducted in the same quarters with tempering (Forging, Machine Shopping, Metal Grinding, Pickling, etc.). Age group estimations showed 3 over 50: 75 between 40 and 50; 228 between 20 and 40; and 15 under 20 years of age.

The hazards of *dust, dirt, dampness, poor light, heat, cold, infections* and industrial stiumulantism were practically the same as for Forging and Blacksmithing. The *fatigue* factor appeared to be somewhat less. In a few places one cause was hurrying piece-work, along with monotonous application. In some instances the work was very sedentary Noise from air blasts and other processes was also noted. The workday was found to be 8 hours in 2 places, 8 to 9 hours in 4 places, and 9 to 10 hours in the remaining 25. The noon recess was ¾ hour in 2 places, and ½ hour in the remaining 29. Overtime was seldom called for. *Poisoning* was found to be a great hazard in this process. In 15 of the plants there was a liability to lead poisoning, and in nearly the same number to acute and chronic poisoning from potassium cyanide. Both of these were dangerous in the form of handling, and hot fumes. It was very common to see large pieces of potassium cyanide lying on the edge of melting pots, or nearby, where it was handled by working men of the most ignorant class, often unable to speak English. Other poisons encountered were sulphuric acid, and the decomposition products of hot oil, as well as escaping furnace fumes.

The general *appearance* of workers was good in 19 places, fair in 8 more, while most were sickly looking in the remaining 4. The complaints of workers were the metallic and oil fumes, heat exposure and drafts. In 8 plants our investigators found 13 instances of industrial disease, as follows: lead poisoning, 12 (7 positive and 5 tentative); dermatitis from potassium cyanide, 1. In another instance a peculiar death was called to our attention which may have been due to potassium cyanide.

Comments.—As potassium cyanide is the most deadly poison used industrially, and as the form in which it is used is the straight chemical compound itself, none but well instructed workers should be employed in its use. All pieces of it should be kept securely locked up, while melting pots should be well hooded and the fumes carried to the exterior. The same precautions should be taken concerning lead as described elsewhere. The workers in many places should also be protected from heat by such means as screens, asbestos shields, air blasts, dark goggles, and, as for all hot-process workers, shower bath provisions. Gloves should be furnished and their wearing insisted upon. In only 2 plants were anything like sufficient precautions taken against poisoning by lead, or potassium cyanide. The use of patented substances to replace potassium cyanide and claimed not to be poisonous has been called into question by chemists in the case of one of them at least. It is declared that this substance broke up and yielded the poisonous cyanide radical when melted for use.

BRAZING.

Brazing consists in the heating of two metallic objects in contact until they fuse, usually with the aid of a hard solder, which contains the elements of brass. It is usually done in forges, or at benches by means of a blowpipe or blast. It is adaptable especially to non-ferrous metals.

Our investigations covered the process in 4 establishments, in 3 cities, representing 53 wage-earners, all males. The work is more or less skilled. There were no unions. There were also no appliances to remove fumes from the vicinity of the workers. In 1 place goggles were furnished, and the workers were also privileged members of a benefit association. The workday was 10 hours in all places, with ½ hour noon recess, except in 1 place, where 1 hour was allowed. In 2 places the work was done in very poorly ventilated quarters, while in 3 places other processes were carried on in the same quarters. There were a total of 10 workers over 40 years and 3 under 20, leaving the balance (40) between 20 and 40 years.

The chief hazard was found to be the fumes which arose during the process, and were composed very largely of zinc, mixed with fuel gas. In 3 places, 7 workers were found who were subject, off and on, to "brass chills" or "braziers' disease." In 1 case a grinder in a neighboring room also suffered similarly. The condition was said to be much worse in the winter. In addition to this hazard, the general *ventilation* of quarters was bad, the *heat* was rather oppressive, while no particular precautions were taken against any of the features which tend to promote *communicable diseases.* Because of the peculiar drying and irritating effect of these fumes upon the throat, there was great inducement to industrial *alcoholism* among workers so employed.

Comments.—With few exceptions all brazing stands should be carefully hooded and a good draft provided to remove zinc oxide, and other metallic fumes and gas, as they escape.

WELDING.

The processes included here are those of acetylene, oxyhydrogen, and electric welding. A brief intervaled contact, such as one sees in the working upon street car rails, was the nature of the electric process occasionally observed. Usually, however, the low voltage and high amperage welding were the processes seen. The other forms were less brilliant, but apt to be more prolonged. Welding was investigated in 18 establinshments in 7 cities, and employed 159 wage-earners, all males. The industries concerned were Coffins and Burial Cases; Copper, Tin and Sheet Iron Goods; Automobiles and Parts; Iron and Steel Forgings; Stoves and Furnaces; Toys and Games; Cutlery and Tools; Scientific Instruments; Cars; Iron and Steel Rolling Mills; and Safes and Vaults.

More or less skilled hands were employed in 11 places, but ordinary labor in the remaining. Such work was done only at intervals in a number of places. In some 6 places, the workers were, clearly, difficult to keep at the process. There were no union organizations. In 2 places the workers had sick benefit privileges. Appliances consisting of shields to protect the eyes were good in 3 places, and fair in 4 more, while in the remaining 11, in which the brilliancy of light was not quite so great, such protective appliances were not worn. Welding was usually performed in a room by itself, but in 5 places it was done in connection with Machine Shopping, Forging, Tinsmithing, and Metal Grinding. The age group estimations were as follows: over 50 years, 2; between 45 and 50 years, 2; from 20 to 40 years, 155.

The chief hazard of this process was the exposure to the *light,* and, in the case of high voltage electric welding, at least, to the effect of actinic rays. The dazzling brilliancy of the light (said to reach 8,000 candle power and a temperature of 7,000° F.) was rendered even more harmful by the fact that it was performed in poorly lighted quarters in a number of places. The light was found to be not only a hazard to the eyes, but also to the skin, even beneath the clothing. In 2 places workers were found suffering from conjunctivitis. Others complained of inability to read at nights, headaches, sore eyes, weak eyes, of the breathing of fumes, and the showers of sparks produced, while hearsay cases of *ophthalmia electrica* were brought to our notice. This is a condition in which, after a brief exposure, the eyes later become greatly inflamed and swollen, and exceedingly painful, the condition lasting from a few hours to several days. The extent of permanent damage to the sight and color sense is not fully known, but permanent weakness and cataract has followed. The rays, particularly from high potential electric welding, also produce "sunburning" of the skin. This was a feature complained of in 5 instances. Being similar to the X-Ray, there is danger of a subsequent formation of cancer, as well as the production of sterility in workers so exposed.

In 7 places workers were found to be employed at piece-work. In 4 places there was danger also of poisoning, especially from lead and brass alloys, upon which the work was being done.

Comments.—All persons with weak eyes should avoid this process. An oculist should see all employes before they are engaged. All such workers should be provided with protection to the eyes, both against sparks and for the light. While in some forms of the process the amount of light produced can be easily borne, its alternate flashing and disappearing is damaging to the human eye. In a number of places, complete helmets or head shields, equipped with layers of red and blue glass in front of the eyes, were provided. These should have been used in some other places where only common dark glasses were provided. For the actinic and X-Rays produced, the worker should wear gloves, and at least heavy leather aprons, if not some form of lead foil incorporated in special cloth. Some forms of glass (Euphos and Hallaner glass) are said to absorb electric and actinic rays. Where fume is produced, suction fans, hoods and other exhausts are necessary.

SOLDERING.

Soldering may be done by hand, or by machinery, the latter especially in the case of the manufacture of tin cans or the sealing of the same in canning factories. In this place we have also included LEAD BURNING, as such work is practically the same as that of soldering (see also Storage Batteries). Solder contains from 30 to 60 per cent of lead. (For hard soldering see "Brazing".)

The industries in which soldering was investigated were as follows: Copper and Tin Goods, 6; Electrical Apparatus, 7; Stoves and Furnaces, 4; Paint Manufacturing (making tin cans), 3; Automobiles and Parts, 3; Instruments, 2; and 1 each of the following: Brass Goods; Cars; Coffins; Art Glass; Oil Refining; Shipbuilding; Advertising Novelties; Machine Shop Products; Rubber; and Chemical Manufacturing. There were a total of 35 establishments in 10 cities investigated, employing 749 employes, of whom 584 were males and 165 were females.

A union organization existed in 1 establishment. The employer's interest in workers' welfare appeared good in 29 establishments, and fair in the remaining 6. An intelligent type of workers was engaged in 27 establishments, while in the remaining 8 a large percentage of ignorant foreigners were employed at the work. Workers appeared to remain well at the work in at least 27 places. Health appliances, consisting principally of hoods and exhausts, or blow fans to remove solder fumes and gas fumes from the vicinity of the workers, appeared good in 2 places, of fair efficiency in 12 more, but absent in the remaining 21. In 4 places some organized instruction was being given in health conservation. In 6 places workers had the privileges of factory benefit associations. In 19 plants the work was practically all unskilled, and in some of these machines performed the actual process. Workrooms were hygienically constructed in 16 places, fairly so in 11 more, and not so in the remaining 8. There was an estimated total of 10 persons over 50 years, 20 between 45 and 50 years, 74 from 40 to 45 years, 610 between 20 and 40 years, and 41 under 20 years. In 14 places other processes were carried on in the same premises, such as Machine Shopping, Polishing, Welding, and Factory Processes.

In 2 places *dust* was a bad feature, due to the presence of other processes, and the same was true to a less extent in 7 more. Such dust helped to spread solder-dust accumulations. Quarters were *clean* and orderly in 21 places, fairly so in 10 more, and not so in the remaining 4. Natural *light* was bad in 2 places and only fair in 4 more, while the same faults were to be found with artificial lighting, as discussed elsewhere. (See Machine Shopping.) General room *ventilation* was good in 9 places, fair in 12 more, and bad in the remaining 14, due to close, stuffy quarters in which the air had no movement; to devitalizing of the air through the presence of gas flames, used in heating the solder; and to the contamination of the air with the products of gas fumes, solder fumes, smoke and acid fumes. In 10 places heat from the process was some hazard to health, due largely to the absence of hoods, protective devices, or air blasts to direct it away from the workers. The process of soldering is not particularly *fatiguing* in itself, but, in a number of hand-work methods, hurrying piece-work, speeding up, monotonous application at similar movements, and constant strain, involving also the eyes, were features, particularly as a fairly large number of youthful persons were so engaged. The workday was found to be 8 hours in 1 place, 8 to 9 hours in 12 places, 9 to 10 hours in 20 places; while in 1 place, employing 2 men, it was 11 hours per day, and 13 hours at night. The noon recess was 1 hour in 7 places, ¾ hour in 4 places, ½ hour in 23 places, and "as desired" in the remaining 1. Where there was no night shift work, there was apt to be a little overtime. The liability to the contraction of *communicable diseases* appeared negligible in 6 places, a fair hazard in 16 more, but a considerable hazard in the remaining 13. The chief reasons for such hazards were spitting upon floors, the absence of cuspidors, inadequate washing places, the use of common towels and drinking cups, poor closets, and the lack of medical supervision. The chief hazard in soldering is that of *poisoning,* due to lead (handled, in the shape of fumes, or as fine dust accumulations); acids, such as hydrochloric, and acetic (chiefly as hot vapors); and zinc chloride fumes, resulting from work upon zinc alloys with hydrochloric acid and a hot soldering iron. Near-sighted persons, and others, through habit, often kept their faces dangerously close to the fumes arising during hand-soldering. Occasionally wood alcohol was also used. With machine soldering the hazards of poisoning were somewhat less, although the extra quantity of fumes present increased the danger unless ventilation about the machines was very good. In 5 places, employing 70 persons, the risks of poisoning appeared negligible; in 15 more there was considerable hazard. while in the remaining 15 it was bad. Inadequate washing facilities and eating at the work benches or around the machines were decided factors, in addition to the methods of working. The industrial inducement to *stimulantism* was about in proportion to the effects of the poisons, since the other hazards were not considerable. Added to this was the frequent inadequacy of drinking water facilities in a number of places.

The general *appearance* of the workers averaged good in 21 places, fair in 10 more, and bad in the remaining 4, although here and there a pale or sickly looking worker was found in nearly all places. The chief *complaints* of the workers were the obvious danger from breathing lead fumes, the effects of acid and other fumes upon the nose, eyes, and throat, the poor ventilation of work quarters, and the danger of getting foreign bodies in the eyes. Personal complaints were sore nose, sore throat, pains in the chest, nausea, loss of appetite, coughing and headaches, in addition to various digestive and nervous disorders which were often clearly due to slow lead poisoning. In 12 places our investigators reported the following instances of *occupational diseases*: lead poisoning, positive, 6; tentative, 4; partially recovered from, 3; a number of hearsay cases were reported; in addition there were cases of tuberculosis, which the fumes appeared to activate.

Comments.—None but healthy workers, who have passed nose, throat, eyes and chest examination should be employed as hand-solderers; work should be so arranged that either the worker is not continually bent over the soldering iron, or a local flexible exhaust arrangement is provided to remove fumes. Particularly is this so where workers have to enter confined spaces, as installing refrigerators in cars, etc. Needless to say that in all rooms in which gas flames are burning constantly, extra efforts towards renewing the air, and especially towards keeping it in motion should be made. Placards warning employes upon how to prevent lead poisoning should be posted up, while in certain sub-processes, workers should be examined periodically for evidences of lead poisoning, when, if found present, they should be put at some other work for a time.—There is also danger of arsenic poisoning wherever acids are used upon metals (the arsenic being present in both the crude acids used and in the metals). Symptoms are apt to come on hours after breathing the fumes with difficulty in breathing leading to pneumonia-like signs, pains in the abdomen, passing of blood in the urine, onset of jaundice and finally death perhaps after several days. (Arsine is the poison inhaled.)

(*To be continued.*)

MARCH MEETING OF STATE BOARD OF HEALTH.

The regular monthly meeting of the State Board of Health was held in Toledo March 24th.

A delegation consisting of officials of Toledo, Maumee, Perrysburg and Lucas County appeared before the Board with reference to a plan for proposed legislation authorizing the creation of sanitary districts for sewerage purposes. Numerous conferences have been held between the officials of the municipalities and the commissioners of Lucas and Wood counties to determine the best possible way of disposing of the sewage and other wastes so as to prevent the pollution of the Maumee River from which Toledo receives its public water supply. After a discussion of the matter, it has been thought advisable to ask the legislature to pass an act authorizing the creation of sanitary districts whereby two or more municipalities or other subdivisions could join in the installation of a sewerage system.

By action of the Board, the Secretary was instructed to prepare a bill to provide for the establishment of sanitary districts and the construction of sewerage improvements for such districts. Because of interest shown in the matter and in acknowledgment of ability in the drafting of such legislation, Mr. W. H. Harris of Maumee was invited to assist in the preparation of the bill. It is not proposed to attempt to have this bill introduced during the present session of the General Assembly but to have it ready for presentation to the legislature which will convene in January, 1917.

The Minutes of the February meeting and the monthly and financial reports of the Secretary were presented and approved.

The plans and specifications of Contract No. 6 of the proposed water purification plan of Cleveland comprising the filter water reservoir and miscellaneous works were approved. The Board also revised the condition of a former approval of plans and specifications for this improvement which will allow the wastes from the water purification plant to be discharged into the Cuyahoga River or Lake Erie until September 1, 1916, at which time a treatment plant for these wastes shall be installed or other methods of disposal satisfactory to the State Board of Health shall be provided to prevent objectionable conditions in the Cuyahoga River or Lake Erie.

Plans were approved for the proposed fire service water supply for Toledo with the condition that all existing connections between the fire service and the public water supply distributing system shall be abandoned and removed and that no future connections between the two systems shall be established and that council shall provide by ordinance for the proper enforcement of this regulation and shall prohibit the establishment of any connections other than fire hydrants to the fire service distributing system.

The Board approved plans for proposed additional sanitary sewers for the city of Hamilton upon condition that the city shall have prepared and submit for approval detail plans for intercepting sewers which shall provide for the collection of the sewage from that portion of the city west of the Great Miami River and the temporary discharge of the same at one outlet and for the ultimate connection of this intercepting sewer with a main interceptor to collect the sewage flow from the entire city and convey the same to a suitable location for treatment works. An accurate record of the location and use of all connections to the proposed sewers is to be maintained and the city council is required to pass an ordinance satisfactory to the State Board of Health regulating the proper use of sanitary and storm water sewers within the city. The plans for the interceptors are to be prepared and submitted to the State Board of Health prior to January 1, 1916.

The Board approved plans for proposed sanitary sewers for the village of Lowellville, Mahoning County, allowing the use of temporary outlets for the discharge of untreated sewage into the Mahoning River until such time as connecting sewers and sewage treatment works shall be deemed necessary by the State Board of Health. The village council is required to pass an ordinance regulating the maintenance and proper use of the sanitary sewers and to provide for the issuance of permits for connections thereto. These sanitary sewers are to be installed prior to January 1, 1917. The Secretary was instructed to advise the officials of Lowellville that in the absence of a public water supply, the proper use and maintenance of the proposed sanitary sewers will be rendered extremely difficult and installation of the proposed sewers should be delayed until a public water supply has been provided.

Plans were approved for proposed additional storm sewerage for Ottawa Hills, a new addition adjacent to the city of Toledo. It is required that the board of county commissioners of Lucas County shall provide for the control of all connections to the proposed sewers and shall prohibit the discharge of sewage or other objectionable wastes into them.

The Board approved plans for a proposed new sewage treatment plant for the city of Mansfield. Filtering material is to be submitted for approval and the city is required to provide for the proper superintendence and maintenance of the existing and proposed sewage treatment plants and to have daily records of operation kept and reported to the State Board of Health at monthly intervals. The city officials are advised that the entrance of surface and roof drainage greatly increases the sewage flow and correspondingly increases the burden upon the sewage pumping and treatment facilities, and that steps should be taken to remove all storm water from the sanitary sewerage system. They were also advised that the proper care and maintenance of the sewage pumping and treatment equipment is of the utmost importance in securing efficient results and preventing rapid deterioration of the improvements. Especial attention is called to the necessity of maintaining the grounds in proper condition and to prohibit the dumping of refuse in the vicinity of the treament plant. The removal of a pest house located near the plant is also advised.

Plans for a proposed sewage treatment plant for the Wayne County Infirmary were approved upon condition that the filtering material is satisfactory and that the plant be installed prior to January 1, 1916. The county commissioners and the superintendent of the infirmary are urged to use great care in providing that the sewers be used strictly for the removal of sewage and to prevent any connections for removal of roof water or surface drainage.

At the request of the officials of the village of Bryan, Williams County, and upon the recommendation of the Governor and Attorney-General, the Board voted to amend its order requiring the village to install the necessary sewers and a sewage treatment plant to correct the pollution of Joe Run and Lynn Run. It is alleged that this improvement could not be made within the time fixed by the State Board of Health because of the present financial condition of the village. The Board amended its order so as to provide that the village of Bryan must make these improvements within five years from the date upon which the amended order is approved by the Governor and Attorney-General.

The Board considered a request from the officials of the city of East Liverpool asking for an extension of time for the installation of the water purification plant for that city. It was stated by the city solicitor that it had been impossible for the city to issue bonds for this improvement prior to the date on which the improvement was to have been made. Upon consideration of this request, the Board voted to extend the time for the completion of the improvement. Contracts for the improvement are to be let within six months and the plant is to be completed within eighteen months after the amended order is approved by the Governor and Attorney-General.

The Board received and approved a report of an inspection of the present district tuberculosis hospital maintained by Montgomery and Preble counties and of a site for a proposed new district hospital to be maintained by these counties. At the request of the joint board of county commissioners and upon the recommendation of the local member, Dr. Howell, the Board voted to rescind its former action approving the Sullivan farm as a site for the proposed hospital. It is the purpose of the joint board of county commissioners to select and secure the approval of another and more suitable location for this institution.

The Secretary presented a communication in regard to the failure of a property owner at Chicago Junction to make changes and improvements in the plumbing in a flat building. The Secretary was instructed to present this matter to the Attorney-General with the request that this owner be prosecuted for failing to obey an order which was issued for these changes and improvements.

Delegates were appointed by the Board to attend the conference of State and Territorial Health Authorities with the Surgeon-General of the U. S. Public Health Service and the conference of State and Provincial Boards of Health of North America. These conferences are to be held in Washington, D. C., May 13 and 14. The Board also appointed delegates to attend the meeting of the National Association for the Study and Prevention of Tuberculosis to be held in Seattle, Washington, June 16 and 17, and the meeting of the American Medical Association section on Public Health to be held in San Francisco June 20-25, 1915.

Dr. Howell presented a report on the insanitary condition of the Cooper and Dayton Hydraulics and the Miami and Erie Canal in the city of Dayton. A committee consisting of Drs. Howell, Grube, Brown and the Secretary was appointed with instructions to bring the matter to the attention of the Attorney-General for the purpose of finding out what, if any action, the State Board of Health can take to remove the conditions complained of.

The next meeting of the State Board of Health will be held in Cincinnati May 4, 1915.

EDITORIAL SECTION.

The Prevalence of Smallpox in Ohio.

Many persons in Ohio do not realize that smallpox is prevalent in so many communities in the state. No doubt they would be much surprised if informed of the fact that there were over 4,700 cases of smallpox reported to this department during the year 1914. During the last few months this disease, in a mild form, has been spreading over many counties in the northern part of the state. In several counties cases are reported from almost every township and from many cities and villages. A study of the map showing these cases as they were reported indicates that the infection spread across the northern part of the state, from east to west, and recent reports show a few cases in several southern counties.

The majority of the cases in the present epidemic are mild; so mild that in many instances a physician is not consulted and the case not reported to the health authorities. Occasionally severe cases are encountered and several deaths have been reported. The disease is quite often brought into a community by a visitor from a locality in which smallpox prevails or by some member of the community visiting in such a locality and then developing the disease after returning home. Unless the first case is promptly quarantined the infection is soon carried to the school, where it spreads rapidly from child to child and from children to their parents.

"Why does the disease spread?" or "Why is not something done to stop the spread of such a dreaded disease?" are questions which are frequently heard. There are four chief reasons why smallpox spreads in Ohio. First, is the failure to enforce proper vaccination. It is a well-known fact that a person who has been successfully vaccinated is almost always immune to smallpox. It is the unvaccinated who contract smallpox and promote its spread. In other words, if every one in Ohio were protected by proper vaccination there would be no smallpox in the state. Investigation shows that only a small fraction of the people living in rural districts and villages have ever been vaccinated. Vaccination is not required in the rural schools and even when an epidemic appears in their vicinity the people are loth to avail themselves of the protection afforded by vaccination. Parents invariably demand that the schools be closed immediately when smallpox is reported but object strenuously when vaccination is required. Quite often we hear the remark that if smallpox is as mild as it is in some cases, vaccination is worse than the disease. In a few instances this may be true but no one knows how soon smallpox will become more severe. Even during the last few months a severe form of the disease has been epidemic in Tennessee and reports show that out of fifty-six cases sixteen deaths resulted. If a similar form of smallpox should be introduced in some of Ohio's unvaccinated districts the loss of life would doubtless exceed that in Tennessee.

The second important reason for the spread of smallpox is the fact that many times whole families are found who have passed through the whole course of smallpox without calling a physician or without reporting the presence of a disease, which they know to be contagious, to the health officials. This is an infraction of the law for the General Code of Ohio (Section 4427) requires that in case a physician is not called the property owner or the head of the family shall report the presence of the disease to the health officer. When the cases are not reported the family is not quarantined and many persons are needlessly exposed. Because of this a mild case is more apt to spread infection than one in which the severity of the illness requires the services of a physician and confines the patient to his bed. A teacher was recently found who had been teaching for several days, while her face, arms and hands were covered with smallpox pustules. It is needless to say that an epidemic resulted.

Third, is the failure of physicians to diagnose and report their cases of smallpox. A great many outbreaks are due to the fact, that because the disease is mild, physicians call the first cases chickenpox or "Cuban itch", and do not insist on quarantine and even fail to report their cases to the health officer. If the first case in the community were correctly diagnosed, reported immediately and properly quarantined, there would be few, if any, exposures. When the family physician saw the teacher mentioned above he thought she had "grippe" followed by some "skin disease." Physicians should remember that the present epidemic is mild and patients are not necessarily confined to bed and frequently do not complain after the initial symptoms have subsided. Very frequently physicians disagree over the diagnosis of a case of smallpox because of its close resemblance to chickenpox, but it must be remembered that the latter is a disease of childhood and is very rare among adults, especially in epidemic form. Occasionally we hear of physicians who do not report their cases because the family dislikes to be quarantined, but the designs of such physicians are usually discovered and they not only receive the blame for the whole epidemic but lose the confidence of many friends and other physicians.

The fourth and last reason for the prevalence of smallpox is the lack of executive ability on the part of those who have authority to enforce necessary regulations. This includes the board of education, the board of health and the health officer. The board of education has the power to adopt and enforce an ordinance requiring vaccination of all school children. Quite often we find a board of education that is very reluctant to adopt such a regulation even though smallpox exists in the school district and the regulations of the state and local boards of health demand its passage under such circumstances. The laws of the state give the local board of health, or the health officer acting in lieu of such a board, the power to enforce proper reporting of cases, and proper quarantine and disinfection. What is the value of physicians reporting cases of smallpox if such cases are not quarantined? Many times complaints are received from physicians that the local authorities do not isolate cases of contagious diseases. Quite often complaints from citizens inform us that smallpox patients are seen in the streets, stores or at public gatherings. It is the duty of the health officer to quarantine all cases reported to him and to investigate those cases which are not reported. The law gives him authority to do this and if he is negligent he is placing the lives of the public in jeopardy and not fulfilling the requirements of his office.

How then shall the spread of smallpox be checked? Since recent and successful vaccination is the only known preventive of smallpox infection it stands to reason that universal vaccination is the most important measure in checking the spread of the disease. Vaccination, when properly performed and carefully supervised is not dangerous. A recent investigation of the histories of hundreds of thousands of vaccinations disclosed only forty-eight deaths and some of those were found to be due to causes in no way connected with the vaccination. Smallpox is very contagious and with so many cases scattered over the state exposure is possible at any time. As soon as a suspicious case is found it should be visited by a physician and thoroughly examined. If found to be smallpox strict quarantine of the patient and those exposed should be immediately enforced. The laws of the state require that quarantine shall continue until the case has recovered and for seventeen days following disinfection if there are others in the house who may develop the disease. Those who have been recently and succssfully vaccinated may be released as soon as disinfection is completed. Unless such measures are adopted and those interested in public health and public welfare act quickly and decisively, the spread of smallpox will continue during the spring and summer as it has during the winter and may include the whole state as it has some of the northern counties.

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Infant Mortality During the Summer Months.

It is a well-known fact that there is a great increase in the infant death rate during the summer months. Statistics covering a number of years show that this annual rise in the death rate begins in May but is highest during July, August and September. The majority of the deaths causing this marked rise in the death rate are due to gastro-enteritis or "summer complaint" as it is commonly called.

In Ohio during the year 1913, 3549 children under 2 years of age died of intestinal disease. Almost two-thirds of these deaths occurred during July, August, and September; or in other words, there were 25 infant deaths in this state each day during these three months. Several investigators estimate that ninety per cent of deaths from gastro-enteritis are preventable, and if children were placed in suitable surroundings and given proper food and care, the number of deaths would be greatly reduced.

Since a careful examination of the stools of these cases shows that organisms resembling the dysentery bacillus are found in almost every case examined, many authorities believe that these intestinal diseases are infectious and may be spread from one infant to another like typhoid or cholera. For this reason each case should be isolated and the excreta disinfected.

From the fact that only three per cent of all cases of intestinal disease occur in infants fed on mother's milk, it is evident that artificial feeding plays an important part in causing these diseases. In other words, infants that are deprived of their mother's milk are thirty-three times more liable to gastro-intestinal disease than are other infants.

Cow's milk, in some form, is usually substituted for mother's milk and in order to avoid sickness it is necessary to secure clean, pure milk and keep it properly cooled or pasteurized. To inhibit the growth of bacteria, the temperature of milk should be kept below 60° F. at all times. Experiments in New York show that pasteurization of milk reduced the infant death rate twenty per cent. Over-feeding or feeding improper foods may cause an indigestion which in time may lead to an active gastro-enteritis.

During the summer months flies are most abundant and since it is certain that bacteria are carried on the feet of flies, they no doubt are active agents in spreading disease. Not only do they infect milk which is left uncovered or the nursing bottle used by the infant, but it is possible for flies to carry infection directly to the lips or fingers of the healthy child. Proper screening is therefore very essential in maintaining the health of children.

Infants suffer from the summer heat more than adults and since they are unable to care for themselves it is necessary for their parents to see that they have suitable clothing and cool, comfortable surroundings. During the excessive heat of the summer months the moisture from the body is evaporated, the digestive secretions are reduced, and the desire for food is diminished. As a result of these changes the growth and metabolism of the infant is retarded and is more susceptible to infection by the various organisms which enter the stomach and intestines.

In the larger cities much good has been accomplished by those societies and organizations which furnish wholesome milk for babies, and by the visiting nurses and dispensary attendants who teach the mothers how to care for their infants during the summer season.

* * *

The Annual Clean-Up.

During the past few years a tendency has grown in a number of communities to conduct an annual spring clean-up. The object is to remove from premises, streets and alleys, the accumulated refuse of the previous year and properly dispose of this material. The promoters of such campaigns are honest in their efforts to improve the appearance and sanitation of the community, and the cleanup is usually conducted with enthusiasm and in a complete manner. We are becoming accustomed to these annual campaigns and are beginning to expect some mention of a general clean-up with the first signs of spring. It is generally the case that following a thorough cleaning of the community the subsequent regular removal of refuse is forgotten and material is permitted to again accumulate in the same places during the ensuing year, or until another spasmodic effort is made to improve the sanitation of the community.

It must be admitted that an annual cleaning of a municipality is a great benefit to the health and comfort of the citizens. It is, however, true that a twelve-months' interval between cleanings is too great and encourages a carelessness in the maintenance of proper sanitary conditions. The object should be to maintain cleanly conditions at all times, rather than to permit accumulation of filth and refuse and to remove the same annually. This can be accomplished only by the provision of efficient systems of collection and disposal of refuse and cleaning of streets and alleys. It should be the object of everyone interested in the proper sanitation of a community to bring about the organization of departments for this work.

* * *

The Fly Season.

The fly has just made its appearance to threaten public health and comfort. It is heralded by the oft-repeated injunction "SWAT THE FLY". In many cities a war has been waged upon the fly in this manner and countless numbers have been destroyed. In spite of this effort the fly continues to exist in not noticeably reduced numbers and it seems hopeless to bring about its extinction by this means. It is well to remember that manure, garbage and other organic refuse, if permitted to accumulate and remain exposed, furnishes the most favorable conditions for the production of flies and are undoubtedly responsible to a large extent for the swarms which infest some communities. By keeping such waste material in tight receptacles protected from exposure and by securing prompt and efficient collection and disposal of the same, the production of flies will greatly be reduced. Moreover, the proper screening of dwellings and places where food is stored, sold, or consumed, is of great importance in preventing fly infection. The destruction of such flies as may reach the interior of buildings is then feasible and accomplishes apparent results. The object should be to maintain cleanly conditions by prompt removal of refuse, thus reducing the production of flies, and to protect food from the danger of fly infection. By this means a greater improvement is to be expected than by an attempt to kill all flies by "swatting".

* * *

The Enforcement of Morbidity Reports.

So much emphasis has been laid upon the necessity of securing proper morbidity reports in the various health publications, including the Ohio Public Health Journal, that no health official should fail to realize the importance of this step. One of the most important duties of the employees of commercial houses is to "take stock", and to always know what stock is on hand. The collection of morbidity reports is the stock-taking of humanity. It is the foundation of the health officer's work, and no health officer can possibly succeed in preventing disease without having on hand accurate and current information as to the extent and distribution of disease within his district.

This being the case we should expect that health officials would be a unit in urging and enforcing proper report of cases of notifiable disease. Unfortunately, such is not the case. Many officials regard the new system of morbidity reports in Ohio with the same horror shown by their grandfathers when music was introduced into the church service, in spite of the fact that the new system was elaborated by and has the approval of all prominent public health workers on the continent. It might almost be said that physicians have shown a greater inclination to observe the new regulations than have health officers; showing that physicians have a higher conception of public health improvement than have many health officers. It has been observed that where a health officer performs his duties faithfully and possesses the respect of the physicians in his community, he has little trouble in securing reports. Conversely, where a health officer performs his duties listlessly, and does not command the respect of physicians, he has difficulty in securing proper reports.

In adopting the essential portions of the Model Morbidity Law as regulations for Ohio, the State Board of Health placed Ohio in the advance guard of states so far as morbidity reports are concerned. Every physician and every health officer in Ohio should do his part in carrying the new system to a successful issue.

Strangely enough, Columbus and some of the smaller cities in the state, where well organized health departments should exist, are behind some of the village and townships in Ohio in the thoroughness with which reports of cases of notifiable disease are secured. In such communities the citizens are not securing the proper amount of health protection in proportion to the amount of money expended.

PUBLIC HEALTH ACTIVITIES IN OHIO.

Ohio State Public Health Exhibit.

The Ohio State Public Health Exhibit has visited recently Van Wert, March 23-26; Greenville, March 30-April 2; and Oxford, April 6-9.

Arrangements have been made to visit Piqua, April 13-16; and Troy, April 20-23. At the close of the Troy exhibition the exhibit will be returned to Columbus for a few days to undergo much needed repairs. It will then be shown at the annual meeting of the Ohio State Medical Association to be held in Cincinnati May 4-6.

Meetings of County Health Officials During March.

At Wauseon, Fulton County, March 5th.
At Bryan, Williams County, March 12th.
At Defiance, Defiance County, March 19th.
At Van Wert, Van Wert County, March 23rd.

These meetings have been attended by Mr. James E. Bauman, Assistant Secretary of the State Health Department, and Dr. F. G. Boudreau, Director of the Division of Communicable Diseases. The meetings at Wauseon and Bryan were not as well attended as could have been hoped but the lack of attendance was no doubt due to the very inclement weather on those days. Meetings at Defiance and Van Wert were well attended and from the expression of those present were of a great deal of benefit. The discussions at these meetings have been along the line of the adoption and enforcement by local boards of health of suitable orders and regulations, the procedure to be followed in the abatement of nuisances, the authority and jurisdiction of boards of health and health officers, and the notification of reportable diseases. It has been the endeavor to fully discuss all questions presented by local health officials and we have reason to believe that the health service in the cities, villages and townships represented at these meetings will be much improved.

Ohio Society for the Prevention of Tuberculosis.

At a meeting of the Executive Committee of the Ohio Society for the Prevention of Tuberculosis, held on March 31 in Columbus, it was decided to examine into the feasibility of organizing a State

Central Committee on Public Health Nursing with a view to solving many of the difficulties which are present in the Ohio public health nursing situation. A plan for carrying on an intensive educational campaign on the subject of tuberculosis was approved. The development of a section on Public Health in the State Conference of Charities and Corrections was approved and the co-operation of the Society was offered in this work. It was decided to print for distribution one thousand copies of a report of the Red Cross Seal campaign in Ohio covering the past five years. The annual meeting of the Society will be held in May, probably at Columbus, the date, time and program for the meeting being left to the Secretary to arrange.

Report of Cincinnati Municipal Tuberculosis Committee.

The Municipal Tuberculosis Committee has just taken the most important forward step in the anti-tuberculosis fight that has been taken in many years. It has formulated a thorough, carefully studied and harmonious plan for the most intensely active and practical fight ever planned by any city against tuberculosis.

At the call of the Anti-Tuberculosis League this committee was formed from representatives of the Health Department, the Department of Charities and Corrections, the Hospital Department, the Tuberculosis Sanatorium, the Anti-Tuberculosis League, the Dental Society, the United States Bureau of Public Health Service, the Associated Charities, the United Jewish Charities, the Saint Vincent de Paul Society, the Council of Social Agencies and the Central Labor Council.

Almost all of these delegates were present at the meeting at which the report of the Drafting Committee, as a result of two months' careful study, was enthusiastically and unanimously adopted with a few changes. Those present were Dr. J. H. Landis, Chairman, Mr. C. Dinwiddie, secretary, Dr. H. Kennon Dunham, Dr. A. C. Bachmeyer, Dr. D. E. Robinson, Dr. Henry Freudenberger, Dr. S. J. Rauh, Dr. Jos. G. Wilson, Mr. T. J. Edmonds, and Dr. Wm. H. Peters. Dr. Peters and Mr. Dinwiddie were appointed a committee to promote the carrying into effect of this report by the different agencies responsible.

Some of the salient features of the program are the following:

Early provision to be made for sanatorium care for incipient cases, especially for children.

A small health center to be established under a joint committee of control from various health and relief agencies, where the most intensive possible health and relief work may be done, especially for tuberculosis, and the most careful study made of the causes of disease and the best methods of curing it as a basis for similar intensive work all over the city.

The taking over of the Anti-Tuberculosis dispensary by the Health Department so that the following much needed items can be taken up by the Anti-Tuberculosis League:

An increase in the capacity of the Bamford Hills Camp for children by 100.

Medical relief in the way of special diets, beds and clothing for outdoor sleeping, window tents, etc.

An increase in the housing inspection force, especially for the issuing and enforcing of orders so that bad housing, a fundamental cause of tuberculosis, may be minimized.

The provision of a special employment agent for arrested and convalescent tuberculous cases and of temporary handicrafts for the employment and as part of the treatment of such patients.

A hearty educational campaign for the adoption of state-wide industrial insurance as a means of providing fully for the victims of the disease and as one of the greatest possible stimuli to preventive measures.

These eight items of new work to be done are only part of the twenty-five in the program adopted by this committee for which the committee invites the support of every health organization and of the public in general.

NEW WORK TO BE DONE.

To be done by.	To be done in 1915.	To be begun in 1915.	To be provided for in 1916 Budget.	To be done in 1916.
Hospital Department.	Dental Staff for Tuberculosis Sanatorium.	Separate provision for 100 less hopeful cases of tuberculosis. Formulation of plans for solarium care for 100 children.	Increased appropriation for medical and nursing staffs and supplies for Tuberculosis Sanatorium.	Instruction camp with capacity for 50 patients, to teach essentials of self-care and home hygiene for 2 weeks to 1 month period.
County Commissioners.	Appropriation or bond issue for sanatorium for 100 incipient adult cases.			
Anti-Tuberculosis League.	Handicraft teacher to be employed for patients at C. T. Sanatorium. City-wide health organization to be formed if feasible. Recreation and entertainment for C. T. S. patients to be greatly increased.			Medical relief for tuberculous patients to be greatly increased. Capacity of Bamford Hills camp for children to be increased by 100.
Health Department.		To take up with Health Board matter of better tuberculosis regulations.	To take over tuberculosis dispensary, increasing nursing force to 15 and provide clinical dental treatment for tuberculous patients, in connection with dispensary. To increase home visiting by physician in tuberculous families where necessary for examination of suspected cases and for supervision. Appointment of 2 men for the study of industrial health hazards with especial reference to tuberculosis. Medical inspection of lodging houses and cheap hotels. Cleansing and liquid disinfection in cases of death or removal of tuberculous patients.	

NEW WORK TO BE DONE—Concluded.

To be done by.	To be done in 1915.	To be begun in 1915.	To be provided for in 1916 Budget.	To be done in 1916.
Housing Inspection.		A separate and carefully drawn housing code or housing section of building code to be drafted.	Housing inspection force to be substantially increased, especially for issuing and enforcing orders.	
Housing Commission.		Comprehensive study of housing conditions in Cincinnati to secure adequate data for more constructive work.		
State-City Employment Bureau.			Additional employment agent to give especial attention to arrested cases of tuberculosis.	
Council of Social Agencies.		Organize temporary employment through shop work, for handicapped, especially arrested and convalescent tuberculous patients.		
Municipal Tuberculosis Committee.	Establishment of small health center for most intensive possible health and relief work, especially for tuberculosis, as a basis for city wide work.	Active work for state-wide industrial insurance in 1916.		

Conference of Tuberculosis Hospital Superintendents.

The third conference of Ohio tuberculosis hospital superintendents was held at the Franklin County Sanatorium on Friday, March 26, 1915.

Those present were: Dr. A. C. Bachmeyer, Municipal Tuberculosis Hospital Cincinnati; Dr. S. A. Douglass, Ohio State Sanatorium, Mt. Vernon; Dr. J. D. Kramer, District Tuberculosis Hospital, Dayton; Mrs. Aloysia Lawin, Franklin County Tuberculosis Sanatorium, Columbus; Dr. Clyde Leeper, Rocky Glen Sanatorium, McConnelsville; Mr. John S. Hofner, Lucas County Tuberculosis Hospital Toledo; Dr. Martin, Ohio State Sanatorium, Mt. Vernon; Dr. H. G. Pamment, Lucas County Tuberculosis Hospital, Toledo; Dr. H. R. Rockwood, Warrensville Tuberculosis Sanatorium, Cleveland; Miss Viola M. Fell, Public Health Nurse, Zanesville; and Mr. Gordon Davies, Ohio State Board of Health, Columbus.

Dr. Douglass, chairman of the committee on standard report and history blanks, submitted a tentative set of blanks for the examination of the conference, but asked for further time in which to submit them to the other members of this committee.

Dr. Kramer, for the committee on hospital regulations, asked for suggestions from the conference as to the matters to be included in the proposed regulations. After a discussion covering the various matters of hospital administration, such as the practice followed in the various institutions in regard to disposal of sputum, disinfection of sputum cups, sterilizaztion of laundry, and related subjects, it was moved and seconded that Dr. Pamment replace Dr. Crawford, resigned, on the committee on regulations, and that each member of the committee submit at the next conference a set of regulations covering the subjects of admission, internal management, and discharge; these reports to be made a special order of business for the next conference. The motion was carried.

A discussion of the possibility of classification of cases of tuberculosis as "first stage," "second stage," and "third stage" cases was then had and the suggestion offered that each superintendent secure the history of each of ten cases, to be selected by himself, for report at the next conference, in the hope of tracing a similarity of early symptoms of the disease. While no definite action was taken, several of the superintendents expressed their intention to collect such histories.

After accepting the invitation of Mr. Hofner to hold the next conference at the Lucas County Tuberculosis Hospital, Friday, May 28th, the session to be held in the afternoon, the conference adjourned.

Franklin County Tuberculosis Hospital.

Franklin County, Ohio, has provided and is operating under the terms and provisions of the General Code of Ohio, a county tuberculosis hospital for the care and treatment of tubercular persons required by section 3139 et seq. of the General Code of Ohio, as amended O. L., 103, page 492, to be cared for in such an institution. The hospital is large, capable of caring for from 120 to 130 patients; a number much greater than Franklin County's needs and requirements at present. The board of county commissioners is therefore prepared, and will receive and care for patients in either incipient or advanced stages of tuberculosis from other counties of the state not provided with hospitals or other means for the proper care and treatment of such persons, at a charge of $9.00 per week, which charge includes medical attention, board, nursing and such clothing as may be necessary or required by the rules of the board of commissioners other than clothing provided the patient upon admission to the hospital.

The hospital is well equipped in every way for the proper care and treatment of tubercular patients. It supports an efficient corps of physicians and nurses, and is in every respect satisfactory to and approved by the State Board of Health. Franklin County will be pleased to receive and properly care for any person who may be properly admitted to an institution of this character, at prices and terms herein stated.

Legislation.

Bills of interest to the public health and social worker which have been introduced in the Eighty-first General Assembly of Ohio up to March 27th are as follows:

SENATE.

S. B. No. 7 — Mr. Lloyd, Franklin Co., Jan. 18. Providing for the regulation and licensing of the loaning of money without security or upon personal property.

Jan. 19 — Judiciary com. Mar. 24 — Substitute bill recommended. Mar. 25 — Amended. Mar. 25 — Passed; yeas 30, nays 0.

S. B. No. 9 — Mr. Carson, Muskingum Co., Jan. 18 — Relative to changes of water supply for cities and villages.

Jan. 19 — Public health com. Feb. 3 — Indefinitely postponed.

S. B. No. 16 — Mr. Archer, Noble Co., Jan. 18. Relative to obtaining marriage licenses.

Jan. 28 — Lost; yeas 13, nays 15.

S. B. No. 23 — Mr. Cass, Putnam Co., Jan. 19. Providing for the appointment of a juvenile and humane officer by common pleas or probate courts of county.

Jan. 20 — Judiciary com.

S. B. No. 29 — Mr. Stone, Lorain Co., Jan. 20. Relating to guardianship and control of inmates of children's homes.

Jan. 21 — Benevolent institutions com.

S. B. No. 54 — Mr. Mooney, Cuyahoga Co., Feb. 1. Providing that applicants for certificates as pharmacist shall have at least two years in approved schools.

Feb. 2 — Medical colleges com.

S. B. No. 55 — Mr. Kennedy, Cuyahoga Co., Feb. 1. Appropriating $5,000 for extension of state free employment agencies.

Feb. 2 — Finance com. Feb. 4 — Recommended. Feb. 9 — Re-committed finance com.

S. B. No. 58 — Mr. Mooney, Cuyahoga Co., Feb. 2. Legalizing practice of Christian Science.

Feb. 3 — Public health com.

S. B. No. 60 — Mr. Bauer, Hamilton Co., Feb. 2 — Defining delinquent and dependent child.

Feb. 3 — Benevolent institutions com. Mar. 4 — Recommended amended. Mar. 9 — Passed; yeas 23, nays 0. Mar. 10 — House judiciary com.

S. B. No. 64 — Mr. Behne, Williams Co., Feb. 3. To give State Board of Health supervision of public vaults and mausoleums.

Feb. 4 — Public health com.

S. B. No. 71 — Mr. Archer, Noble Co., Feb. 8. Providing for the registration of bottles, siphons, siphon tops, fountain tanks, kegs, or other containers; and making it unlawful for any person, other than the owner thereof, to fill, refill, deal or traffic in such bottles and other containers.

Feb. 18 — Passed; yeas 23, nays 2. Feb. 24 — House public health com. Mar. 4 — Recommended. Mar. 11 — Passed House; yeas 89, nays 8.

S. B. No. 73 — Mr. Mooney, Cuyahoga Co., Feb. 8. Relating to the board of state charities, the juvenile court and county children's homes.

Feb. 9 — Benevolent institutions com. Mar. 11 — Recommended amended. Mar. 17 — Amended. Mar. 17 — Lost; yeas 12, nays 17. Mar. 18 — Reconsidered; special order March 23, 3 P. M. Mar. 23 — Passed; yeas 22, nays 7. Mar. 26 — House penal institutions com.

S. B. No. 75 — Mr. Wickline, Summit Co., Feb. 8. To provide for the further regulation of embalming and the preparation and disposal of the dead.

Feb. 9 — Public health com.

S. B. No. 84 — Mr. Lloyd, Franklin Co., Feb. 9. Relating to the practice of dentistry.

Feb. 10 — Public health com. Feb. 25 — Recommended amended. Mar. 2 — Amended. Mar. 2 — Passed; yeas 29, nays 0. Mar. 4 — House public health com. Mar. 18 — Recommended.

S. B. No. 103 — Mr. Vorhies, Guernsey Co., Feb. 12. Requiring physicians to report prevalence of certain diseases to state board of health.

Feb. 15—Public health com. Mar. 18 — Passed; yeas 18, nays 5. Mar. 26 — Public health com. House.

S. B. No. 131 — Mr. Lloyd, Franklin Co., Feb. 24. Relating to the registration of pharmacists.

Feb. 25 — Public health com.

HOUSE.

H. B. No. 14 — Mr. Young, Cuyahoga Co., Jan. 19. Relative to the employment of females and regulating their hours of employment.

Jan. 20 — Labor com.

H. B. No. 17 — Mr. Bohm, Cuyahoga Co., Jan. 19. Giving one rest day a week to employes in certain trades.

Jan. 20 — Labor com. Mar. 18 — Recommended amended.

H. B. No. 61 — Mr. Deaton, Miami Co., Jan. 19. Permitting probate court to issue marriage license to persons under legal age who have no guardian.

Jan. 20 — Codes, courts and procedure com. Feb. 1 — Recommended amended. Feb. 3 — Amended. Feb. 3 — Passed; yeas 96, nays 5.

Feb. 8 — Senate Judiciary com. Feb. 24 — Without recommendation. Feb. 25 — Passed; yeas 17, nays 7. Approved by Governor.

H. B. No. 64 — Mr. Deaton, Miami Co., Jan. 19. To place bureau of vital statistics under state board of health.

Jan. 20 — Public health com. Feb. 11 — Recommended amended. Feb. 18 — Lost; nays 79, yeas 24.

H. B. No. 94 — Mr. Walsh, Cuyahoga Co., Jan. 19. To provide for admission of feeble-minded youths to state institutions.

Jan. 27 — Passed; yeas 107, nays 0. Feb. 1 — State benevolent institutions com. Feb. 2 — Recommended. Feb. 4 — Passed Senate; yeas 26, nays 0. Approved by Governor.

H. B. No. 98 — Mr. Young, Cuyahoga Co., Jan. 20. To indemnify persons unjustly imprisoned by the state.

Jan. 21 — Benevolent and penal institutions com.

H. B. No. 103 — Mr. Garver, Holmes Co., Jan. 20. Providing payment of fees in prosecutions for bastardy.

Jan. 21 — Judiciary com. Mar. 19 — Recommended amended.

H. B. No. 104 — Mr. Cromley, Knox Co., Jan. 20. To repeal indeterminate sentence law.

Jan. 21 — Codes, courts and procedure com. Feb. 3 — Reported without recommendation. Feb. 9 — Lost; yeas 40, nays 65. Feb. 18 — Reconsidered and passed, yeas 71, nays 41. Feb. 19 — Senate judiciary com.

H. B. No. 121 — Mr. Hoy, Jackson Co., Jan. 21. Authorizing the state board of health to produce free diphtheria antitoxin.

Jan. 25 — Public health com. Jan. 28 — Recommended. Feb. 2 — Passed; yeas 106, nays 1. Feb. 3 — Senate public health com. Feb. 11 — Recommended. Feb. 18 — Passed, yeas 27, nays 0. Approved by Governor.

H. B. No. 132 — Mr. Platt, Ashtabula Co., Jan. 25. To transfer from agricultural commission to state board of pharmacy the power of enforcing regulation of sale of drugs.

Jan. 26 — Agriculture com. Mar. 15 — Recommended amended.

H. B. No. 135 — Mr. Morris, Fairfield Co., Jan. 25. Exempting school buildings of one room from provisions of law on fire exits.

Jan. 26 — Common schools com. Feb. 12 — Recommended. Feb. 24 — Recommitted to public building and land com.

H. B. No. 138 — Mr. Jones, Franklin Co., Jan. 25. To provide for prosecution of suit over possession of a child.

Jan. 26 — Judiciary com. Feb. 10 — Recommended amended. Feb. 17 — Lost; yeas 50, nays 53.

H. B. No. 140 — Mr. Jones, Franklin Co., Jan. 25. To provide for adoption of minor child by an unmarried person or husband and wife.

Jan. 26 — Codes, courts and procedure com.

H. B. No. 142 — Mr. Hoy, Jackson Co., Jan. 25. To bar undesirables from the practice of medicine.

Feb. 19 — Passed; yeas 71, nays 13. Mar. 9 — Senate medical colleges com. Mar. 26 — Recommended amended.

H. B. No. 150 — Mr. Black, Wyandotte Co., Jan. 25. Transferring control of the woman's reformatory at Marysville from the building commission to the state board of administration.

Jan. 26 — Benevolent and penal institutions com. Feb. 12 — Recommended amended. Feb. 24 — Passed; yeas 95, nays 0. Feb. 26 — Senate Benevolent institutions com. Mar. 24 — Recommended.

H. B. No. 154 — Mr. Morris, Fairfield Co., Jan. 26. Providing new conditions for entrance to Mt. Vernon tuberculosis sanatorium.

Jan. 28 — Public health com. Feb. 19 — Recommended amended. Feb. 25 — Passed; yeas 91, nays 0. Mar. 1 — Senate Judiciary com Mar. 11 — Recommended. Mar. 26 — Recommitted Senate judiciary com.

H. B. No. 156 — Mr. Ott, Hamilton Co., Jan. 26. Providing that street car men shall have 13 hours rest out of every 24 hours.

Jan. 28 — Labor com. Mar. 4 — Recommended amended. Mar. 24 — Amended. Mar. 24 — Recommitted labor com.

H. B. No. 175 — Mr. Bohn, Cuyahoga Co., Feb. 1. Empowering State Industrial Commission to license all private employment agencies and regulate their activities.

Feb. 3 — Labor com.

H. B. No. 177 — Mr. Terrell, Cuyahoga Co., Feb. 1. To permit Christian Science healers to practice and collect fees.

Feb. 3 — Codes, courts and procedure com.

H. B. No. 190 — Mr. King, Hocking Co., Feb. 1. To legalize agreements between employer and employe and limit injunctions.

Feb. 3 — Labor com.

H. B. No. 203 — Mr. Chapman, Montgomery Co., Feb. 1. Providing county commissioners may maintain comfort stations on county property.

Feb. 3 — County affairs com. Mar. 12 — Recommended.

H. B. No. 218 — Mr. Whittacre, Columbiana Co., Feb. 1. Appropriates $5,000 for extending system of free employment agencies.

Feb. 1 — Appropriation com. Feb. 3 — Recommended. Feb. 9 — Passed; yeas 101, nays 0. Feb. 17 — Passed Senate, yeas 24, nays 0.

H. B. No. 220 — Mr. Platt, Ashtabula Co., Feb. 3 — To authorize and regulate the practice of chiropractic.

Feb. 8 — Public health com.

Mar. 26 — Recommended amended.

H. B. No. 227 — Mr. Hunter, Franklin Co., Feb. 3. To provide for a survey, examination and report upon waterways of the state by special board.

Feb. 8 — Public works com.

H. B. No. 231 — Mr. Powell, Gallia Co., Feb. 3 — Prohibiting the contamination of streams and other water courses and bodies of water by the discharge of wastes from manufacturing, rectifying or other plants.

Feb. 8 — Public health com.

H. B. No. 244 — Mr. Nieding, Lorain Co., Feb. 3. To create the department of public health and medical registration.

Feb. 8 — Public health com.

H. B. No. 249 — Mr. Cowan, Putnam Co., Feb. 3. Relating to the admission of persons to state institutions.

Feb. 25 — Passed; yeas 94, nays 0. Mar. 1 — Senate prisons com. Mar. 17 — Recommended. Mar. 23 — Passed Senate; yeas 23, nays 0.

H. B. No. 250 — Mr. Oberlin, Stark Co., Feb. 3. Providing for the commitment of inebriates, dipsomaniacs or persons addicted to the habitual use of drugs to hospital for the insane.

Feb. 8 — Public health com. Mar. 4 — Recommended amended. Mar. 24 — Amended. Mar. 24 — Passed; yeas 76, nays 16. Mar. 26 — Senate judiciary com.

H. B. No. 269 — Mr. Fox, Lucas Co., Feb. 8. To provide for the extension of sewer districts outside of municipalities.

Feb. 10 — County affairs com. Mar. 10 — Recommended amended.

H. B. No. 270 — Mr. Hoy, Jackson Co., Feb. 10. Relating to custody of minor children.

Feb. 11 — Codes, courts and procedure com.

H. B. No. 277 — Mr. Hyle, Cuyahoga Co., Feb. 11. Relative to Ohio State building code.

Feb. 15 — Public buildings and lands com.

H. B. No. 279 — Mr. Hyle, Cuyahoga Co., Feb. 11. To provide for the support of persons who have become permanently incapacitated for work by reason of physical or mental infirmity or by reason of having attained an age in excess of 65 years.

Feb. 15 — Codes, courts and procedure com.

H. B. No. 280 — Mr. Fitzsimmons, Cuyahoga Co., Feb. 11. To provide for the proper cleaning of all railroad or railway passenger cars or coaches operated within the State of Ohio.

Feb. 15 — Public health com. Mar. 4 — Indefinitely postponed.

H. B. No. 292 — Mr. Jones, Franklin Co., Feb. 11. To prevent minors from becoming vagrants.

Feb. 15 — Judiciary com.

H. B. No. 301 — Mr. Beitler, Hancock Co., Feb. 15. Relating to the labeling and care of poisonous substances.

Feb. 16 — Public health com.

H. B. No. 302 — Mr. Palmer, Henry Co., Feb. 15. To prohibit the sale of soda water, soft drinks or other beverages to which has been added morphine, caffeine, cocaine or strychnine.

Feb. 16 — Public health com.

H. B. No. 305 — Mr. Hoy, Jackson Co., Feb. 15. To regulate the sale, distribution, giving away of opium, and to regulate the treatment and to provide for the committal of the habitual users of such drugs.

Feb. 16 — Public health com.

H. B. No. 311 — Mr. Cowan, Putnam Co., Feb. 15. To prevent the procreation of defectives and to provide for operation for the prevention of procreation.

Feb. 16 — Public health com.

H. B. No. 318 — Mr. Hulswitt, Hamilton Co., Feb. 16. Relating to lunatics, idiots and imbeciles.

Feb. 17 — Codes, courts and procedure com. Mar. 4 — Recommended.

H. B. No. 321 — Mr. Beetham, Harrison Co., Feb. 16. Making it unlawful for any person to falsely represent himself or herself as blind, deaf, dumb, crippled.

Feb. 17 — Judiciary com. Mar. 4 — Recommended. Mar. 24 — Passed; yeas 81, nays 11. Mar. 25 — Senate judiciary com.

H. B. No. 323 — Mr. Sprague, Scioto Co., Feb. 16. To regulate the practice of nursing.

Feb. 17 — Universities and colleges com.

H. B. No. 351 — Mr. White, Columbiana Co., Feb. 26. Placing control of maternity hospitals and boarding houses for infants under board of state charities.

Mar. 1 — Benevolent and penal institutions com.

Mar. 18 — Recommended · amended.

H. B. No. 360 — Mr. Hoy, Jackson Co., Feb. 26. Providing additional allowance for surgical attendance in industrial accidents.

Mar. 1 — Public health com.

H. B. No. 376 — Mr. White, Columbiana Co., Mar. 1. To provide for the control of the educational requirements and registration of pharmacists.

Mar. 4 — Universities, colleges and normal schools com.

H. B. No. 380 — Mr. Young, Cuyahoga Co., Mar. 1. To enjoin and abate houses of prostitution.

Mar. 4 — Public health com.

H. B. No. 384 — Mr. Ott, Hamilton Co., Mar. 1. Relating to the inspection of plumbing.

Mar. 4 — Public health com.

H. B. No. 390 — Mr. Hoy, Jackson Co., Mar. 1. To regulate the sale or the disposition, in any manner, of opium or coca leaves.

Mar. 1 — Public health com.

H. B. No. 392 — Mr. Cromley, Knox Co., Mar. 1. Relating to the definition of "imbecile".

Mar. 4 — Codes, courts and procedure com.

H. B. No. 393 — Mr. Nieding, Lorain Co., Mar. 1. To legalize the sale of drugs in stores other than drug stores.

Mar. 4 — Public health com.

H. B. No. 395 — Mr. Snyder, Pickaway Co., Mar. 1. Relating to the control of municipal hospitals.

Mar. 4 — Judiciary com. Mar. 18 — Recommended amended.

H. B. No. 397 — Mr. Knox, Washington Co., Mar. 1. To provide for the examination and admission to practice of naturopathic physicians.

Mar. 4 — Public health com.

H. B. No. 425 — Mr. Beitler, Hancock Co., Mar. 4. Relative to admission of non-residents to state benevolent institutions.

Mar. 8 — Benevolent and penal institutions com.

H. B. No. 433 — Mr. Shank, Medina Co., Mar. 4. Relating to the admission of children to children's homes.

Mar. 8 — County affairs com.

H. B. No. 435 — Mr. Haines, Tuscarawas Co., Mar. 4. To regulate and control the delivery to hospitals of persons seriously sick or injured.

Mar. 8 — Public health com.

H. B. No. 438 — Mr. Platt, Ashtabula Co., Mar. 4. Relating to the state building code.

Mar. 8 — Public buildings com. Mar. 12 — Recommended.

H. B. No. 456 — Mr. Chester, Paulding Co., Mar. 9. To provide for the control and management of the public parks of the state.

Mar. 10 — Agriculture com. Mar. 22 — Recommended amended.

H. B. No. 470 — Mr. Deaton, Miami Co., Mar. 10. For the prevention of blindness from inflammation of the eyes of the new born.

Mar. 12 — Public health com. Mar. 26 — Recommended.

H. B. No. 477 — Mr. Hasselman, Cuyahoga Co., Mar. 11. Relative to sale of real estate held by charitable or religious societies.

Mar. 12 — Economic betterment com.

Mar. 18 — Recommended.

H. B. No. 484 — Mr. Fleming, Mahoning Co., Mar. 12. Permitting child finishing eighth grade to work regardless of age.

Mar. 15 — Labor com.

H. B. No. 495 — Mr. Oberlin, Stark Co., Mar. 15. Providing for an institution for deformed and crippled children.

Mar. 19 — Public health com.

H. B. No. 496 — Mr. Clark, Mar. 15. To provide for educational requirements and registration of pharmacists.

Mar. 19 — College com.

H. B. No. 511 — Mr. Etling, Wayne Co., Mar. 18. Changing registration of pharmacists.

Mar. 19 — Colleges com.

H. B. No. 516 — Mr. Spencer, Meigs Co., Mar. 18. Authorizing insurance companies to insure lives of children between the ages of 5 and 15 for not more than $100.

Mar. 19 — Insurance com.

H. B. No. 543 — Mr. Fox, Lucas Co., Mar. 23. To permit the practice of Christian Science.

Mar. 26 — Judiciary com.

H. B. No. 559 — Mr. Snyder, Pickaway Co., Mar. 25. Relating to statute of limitations.

Mar. 26 — Judiciary com.

CURRENT COMMENT ON MATTERS OF PUBLIC HEALTH AND SANITATION.

Interstate Migration of Tuberculous Persons.*

An investigation of the interstate migration of tuberculous persons and its bearing on the public health was undertaken in the States of North and South Carolina, over a period covering from November 22, 1913, to June 3, 1914. Its object was to determine the extent and direction of such migration; the effect of travel on tuberculous persons themselves; the bearing of the migration of tuberculous persons on the health of other travelers and on employes of common carriers; the conditions under which tuberculous persons live in localities resorted to for change of climate and the effects of these conditions on the progress of their disease; the bearing of the presence of tuberculous persons on the health and the social and economic status of communities to which they have migrated in search of health; and the degree of forced migration of indigent tuberculous persons from communities hostile to their presence.

On the whole the climates of the several resorts of North and South Carolina are mild, being warmer and dryer than the climate of the Adirondack region, but not as dry as the southwestern plateaus of Arizona and New Mexico.

The principal object of the migration of the tuberculous from one section to another is to secure change of climate. They are led to seek this change for various reasons, among which may be mentioned: glowing accounts of the climatic advantages of particular resorts, unsatisfactory progress toward recovery in their existing surroundings; the long duration of the disease; and the advice of their physicians.

As a result of the studies made in the principal localities in North and South Carolina resorted to by the tuberculous, the following facts appear to be manifest:

1. The migration of the tuberculous is not as extensive as it was formerly. This is especially true of several of the resort towns which formerly were much frequented by the tuberculous but are now almost exclusively tourist resorts.

2. With the possible exception of Asheville, N. C., the problem of the indigent tuberculous does not exist in any of the resort towns

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* Abstract Public Health Reports, Vol. 30, No. 11.

visited, nor was evidence found of forced migration of tuberculous persons from one place to another.

3. Ordinarily, travel has a fatiguing effect on tuberculous travelers and in advanced cases may be dangerous.

4. The danger of infection to other travelers and to employes of common carriers, while present in limited degree, is not very great.

5. Tuberculous persons should, under no circumstances, seek changes of climate unless they are financially able to make the riquired journey in comfort and live in their new environment under conditions of comfort equal to or better than those to which they have been accustomed.

6. Before advising tuberculous patients in respect to change of climate, physicians should take into account not only the stage of the disease, but the financial status of the patient and his disposition relative to ability to endure separation from family and friends. Physicians should also ascertain whether suitable accommodations are available and whether competent medical advice may be obtained in the locality to which the patient is to be sent for climatic treatment. Both of these factors are indispensable in the proper treatment of the disease.

Serotherapy in Scarlet Fever.

The use of serums in the treatment of severe forms of scarlet fever is highly recommended in recent communications from Petrograd. To secure the best results the treatment should be given by the fourth day, and in full doses.

This form of treatment was used in 1,335 of 21,000 cases of scarlet fever in the last nine years. While the disease is not shortened, kidney complications are said to be very rare when the serum is used. Best results are obtained in those cases which show the presence of streptococci in the blood. The serum treatment should only be used in the severe cases and in patients over one year of age.—*Abst. J. A. M. A., 1915.*

Schick Toxin Reaction For Immunity in Diphtheria.

Following recent experiments in the uses of the Schick reaction in diphtheria, Kolmer and Moshage give the following eight interesting facts as a summary of their work:

1. The Schick test is a reliable method for detecting susceptibility to diphtheria. 2. The blood of persons showing a negative reaction to this test usually contains at least 1/20 unit of diphtheria

antitoxin per cubic centimeter of serum, and these persons are probably immune. 3. The blood of persons showing a positive reaction usually contains less than 1/40 unit of antitoxin per cubic centimeter or none at all. Such persons are susceptible to infection and should be injected with antitoxin if exposed to the disease. 4. About 40% to 50% of children from 1 to 15 years of age react positively to the test, showing that passive immunization is unnecessary. 5. Immunity conferred by an injection of antitoxin begins to disappear at the 10th day and usually disappears entirely after the 4th week. 6. The toxin reaction also shows the increased susceptibility of scarlet fever patients to diphtheria. Even after an immunizing dose of antitoxin 10% are susceptible within 10 days. 7. The application of the Schick test shows that immunity following an attack of diphtheria is usually of short duration or entirely absent. 8. The most practical application of the Schick test is its use in determining those cases which should receive immunizing doses of antitoxin following exposure to diphtheria.—*Abst. J. A. M. A., 1915.*

Autohemotherapy in Typhoid.

Four years ago Ramond and Goubert published their experiences showing favorable results in the treatment of infectious diseases by the use of subcutaneous injection of the patient's own blood.

Recent experiments with 50 cases of typhoid show similar results. There was marked improvement in 38%; moderate improvement in 18%; and no improvement in 44% of the cases injected.

The blood is drawn from a vein and immediately reinjected into the cellular tissue. Following the injection there is a temporary rise in temperature which is usually followed by a fall below the original temperature and improvement in the general condition of the patient.

If found beneficial these injections may be repeated daily.—*Abst. J. A. M. A., 1915.*

The Value of Typhoid Vaccine in the Treatment of Typhoid Fever.

Since the use of vaccine as a prophylactic in typhoid fever has been so successful a number of physicians have been experimenting in order to determine its value as a therapeutic agent. In the Pennsylvania Hospital, ninety-three cases of typhoid fever were injected with vaccine at various intervals during the course of the disease and the results when tabulated form the basis for some general conclusions in regard to vaccine as a treatment for typhoid fever.

In the first series, comprising forty-four cases, Mulford's Stock

Typho-bacterin was used. The Widal reaction was positive before vaccination in twenty-four cases and suggestive in six. Four of the fourteen negative Widals gave positive blood cultures. The total dosage varied from 50,000,000 to 1,650,000,000 given in one to five doses. In the forty-four cases there were four deaths, three relapses and twelve complications.

The second series of thirty-three cases was treated with vaccine prepared from the "Rawling's" strain of typhoid bacilli. The total dosage varied from 200,000,000 to 1,450,000,000 given in from one to three doses. In this series there were three deaths but only one of these deaths was due to typhoid directly and in this one case the vaccine was not administered until the twenty-sixth day of the disease. One patient had already developed pneumonia before the vaccine was given and the other developed lobar pneumonia after ten days of normal temperature. In the thirty-three cases there were two relapses and four complications. In almost every case there was a temporary rise of from one to three degrees, followed by a fall of temperature in twenty-three cases that frequently reached normal.

The third series consisted of sixteen cases in which the total dosage ranged between 850,000,000 and 3,350,000,000 given in one to five doses. There were no deaths, no relapses and only one complication (broncho-pneumonia after eighteen days of normal temperature). The average duration of fever after the first injection of vaccine was 21.6 days. The average date of first vaccination was on the twelfth day. Two cases vaccinated before the tenth day showed only sixteen days of fever.

From this study of the ninety-three cases the following conclusions may be drawn:

1. The use of typhoid vaccines to stimulate further antibody formation has a logical theoretical basis although its mode of action has not been demonstrated experimentally. The rise in the agglutinin curves after vaccination is practical proof of its value.

2. Proper use of vaccine rarely produces any noticeable aggravation of symptoms aside from a temporary rise in temperature.

3. The best results are obtained if the injections are begun before the tenth day. A blood culture is more valuable than a Widal test as a diagnostic agent in the early stages.

4. The use of vaccine is contra-indicated in very toxic cases, during hemorrhages or in the presence of other complications.

5. The best dosage has not been determined. Some investigators have obtained good results with small doses, and others apparently equally good results with large doses. The condition of the patient,

the preparation of the vaccine and the severity of the epidemic are factors which must be considered in determining the dose. In the above cases 500,000,000 was considered the best initial dose for the average adult. If this proved to be the proper amount, two or more larger doses were given at three-day intervals.—*Abst. American Jour. of Medical Sciences, 1915.*

The Anti-Vaccination Crusade.

Since the smallpox now prevalent is so mild, the crusade against vaccination is gaining ground. The opponents of vaccination are fully aware of the immunity it produces, but argue that the mild form of smallpox is less fatal and less severe than vaccination. While it is true that the mortality rate of smallpox is very low a recent search for deaths from vaccination revealed only forty-eight fatalities which could possibly be attributed to that cause among hundreds of thousands of vaccinations. Many cases of tetanus are said to be the result of vaccination but in the few instances in which tetanus does follow vaccination the onset of the tetanus is usually several weeks after the vaccination and therefore only a coincidence. In seventy-five per cent of the cases in which tetanus is fatal the period of incubation is less than ten days. Whenever vaccination is neglected or omitted the death rate from smallpox increases and where vaccination is made compulsory there are no deaths from smallpox, as in Germany and Porto Rico.

A reduction in the complications would make vaccination less dangerous. Many complications in vaccination are due to carelessness on the part of the physician and lack of proper treatment on the part of the parents and patients. If the physician does not observe rigid asepsis in vaccinating or the mother permits the child to remove the dressings and infect the wound the vaccination should not be blamed for unsatisfactory results. Those who have been vaccinated or have had the disease are very inconsiderate regarding the protection of those not immune and for this reason those who support vaccination meet with opposition or indifference. The abandonment of compulsory vaccination in the public schools would certainly be disastrous. "It certainly behooves the medical profession to bestir itself to check this new crusade against public health." It is selfishness and folly to allow children to go to destruction because their parents are ignorant. The law must stand as it is and be enforced, but by carefulness on the part of the physicians and parents the dangers of vaccination can be completely overcome.—*Abst. American Medicine, 1915.*

The Treatment and Prophylaxis of Whooping Cough.

At a meeting of the Medical Association of the Greater City of New York, in January, 1915, Dr. Paul Luttinger discussed the use of vaccine in the treatment and prophylaxis of whooping cough. He found that although the use of the vaccine shortened the duration of the disease and reduced the number and severity of the paroxysms, it did not give such good results as was indicated by reports from Europe. It is not certain that the Bordet-Gengou bacillus is the cause of whooping cough but the doubt is so slight that further experiments with the vaccine should be made. Luttinger thinks that some failures may be due to too small dosage and that a larger dose may produce better results. During the discussion, it was suggested that possibly whooping cough is contagious only during the catarrhal stage. If such a theory should prove to be true the present rules of isolation would have to be changed. This is only a suggestion, however, and until it is proven true the present restrictions must be enforced.—Abst. *American Medicine.*

The Control of a Trachoma Outbreak at Youngstown, Ohio.*

In January, 1914, the Youngstown Sheet & Tube Co., located at Youngstown, Ohio, made a request through the Ohio State Board of Health for the detail of an officer to make a survey of the workmen and the conditions under which they worked and lived, with regard to the treatment and control of an outbreak of trachoma, which had been discovered among those employed in the plant and others living in the village of East Youngstown, Ohio.

Surg. J. W. Schereschewsky, of the United States Public Health Service, was detailed to make the investigation, and his report was published in the Monthly Bulletin of April, 1914, pages 521 to 533.

On March 4, 1915, Mr. C. S. Robinson, second vice president of the Youngstown Sheet & Tube Co., forwarded the following statement of what they had accomplished and were accomplishing as a result of the recommendations made at the time of the investigation:

On February 9, 1914, the Youngstown Sheet & Tube Co. opened a trachoma hospital in a building two doors west of the north entrance of their plant. This was a brick building which had been used for a saloon and rooming house.

The services of a registered nurse were secured on full time.

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* Abstract Public Health Reports, Vol. 30, No. 13.

The services of an eye specialist for treatment and diagnosis, who gave as much of his time daily to the work as was required, was also arranged for.

The hospital was equipped with cots and cot beds, bedding, etc., for 36 patients. A kitchen and dining and lounging rooms were equipped, and necessary medicines, chairs, and instruments for treatment provided. A bathroom with three shower baths was installed.

All the men whom the company's surgeon pronounced to be afflicted with trachoma were brough to the hospital for treatment, and the patients decided to be a menace to other persons were confined in the hospital. These men were stripped, bathed, and given new clothing; the old clothing was fumigated and returned to them when discharged.

A house-to-house survey of the village of East Youngstown was made by one of the company's officials with the village health officer, and all suspicious eye cases were sent to the hospital.

Placards in English and a number of foreign languages, telling of the danger of eye diseases, were posted throughout the mill and village.

Living conditions in boarding houses were investigated and suggestions made to remedy those found to be bad.

Where it was found necessary to operate to relieve sufferers this was done by the specialist.

The hospital was open from February 9 to August 31, 1914, and during most of this time the services of a nurse of the Blind Commission of the State of Ohio were furnished gratuitously. During the time the hospital was in use 242 patients were treated, 187 of these being employed by the company. Sixty-two cases were in quarantine, eight of which were outside patients. Thirteen thousand one hundred and eighty-three treatments were given. While the hospital is nominally closed, trachoma patients are still being treated, there being nine at this time. The specialist makes the diagnosis and the nurse of the Ohio Blind Commission, who is still on duty, gives treatment.

On March 1, 1914, the company employed a surgeon on full time, who now has an assisstant.

Physical examination of all persons applying for work is being made.

A health board for the village has been appointed, the company's chief surgeon being one of the board.

Arrangements have about been completed by the village for a good water supply.

The partly completed sewerage system has been finished. Insanitary privies are being abated under the direction of the health board.

A garbage collection and disposal system has been installed.

An attempt is being made to regulate overcrowding of lodging and boarding houses.

Streets are rapidly being graded and paved.

A physician has been appointed village health officer.

Thus it can be seen that most of the recommendations affecting the village have been carried out, or work is being done to this end.

Ophthalmia Neonatorum and Blindness.

The effects of few diseases are so tragic as ophthalmia neonatorum. The victims are always absolutely defenseless and helpless, and many of them are condemned to a lifetime of darkness and dependence. Furthermore, few diseases are so preventable and needless. Statistics carefully gathered from Great Britain and America by government authority and by institutions and private organizations indicate that fully twenty-five per cent of all blindness among children and ten per cent of all blindness may be attributed to this cause. On the continent of Europe it is said that the proportion of child victims of this disease of ignorance, is much greater, running as high as forty-six per cent of all blindness in children in Paris. The New York Association for the Blind estimated that there were in 1906, 620 blind persons in the state of New York alone, who would never have been blind if proper precautions had been taken at birth. Taking an average from the statistics of new admissions from ten large schools for the blind in the United States and Canada, it is found that 28 per cent were victims of opthalmia neonatorum. The average for ten years in the Pennsylvania School for the Blind shows that 33.7 per cent of those admitted were blind from this cause.

In connection with a discussion of this disease it is important to note that in cities a large proportion of confinements are attended by midwives. In New York City there were in 1908, 1382 registered midwives, and in 1907, 52,536 births were reported by midwives, to 68,186 by physicians. It is obviously impossible wholly to eliminate the midwife under these conditions, and authorities should therefore insist that such persons be properly trained and controlled.

The importance of this disease to the taxpayers is shown by the fact that it requires $3,000 from public funds to educate a blind child. There is further loss to the individual of earning capacity which often makes him and his family public charges.

The disease may not only be prevented by prophylactic measures, but it may be cured by proper treatment. The prevention of blindness from this cause is so simple and inexpensive, that the campaign for prevention is almost wholly one of education. Some legislation is also necessary, as is the full co-operation of all organizations interested in public health work. Abstr. *J. A. M. A.*, 1914.

Marriage Annulled On Account of Concealment of Disease.

A marriage was recently annulled by a New York judge on the ground that the husband had deceived his wife by concealing from her at the time of marriage the fact that he was suffering from tuberculosis. This decision is of great importance, for if deception in this case justified the abrogation of the marriage, how many marriages should be dissolved on account of concealment of venereal disease? The state of health of the contracting parties to a marriage is of vastly more importance than their financial standing. While absolute guarantees of health cannot be given, there is no reason why approximately accurate statements of health should not be given. If Judge Blanchard's decision becomes an accepted legal principle, it should result in the more general acceptance of the idea of a physician's certificate of health before marriage.—Abs. *Medical Review of Reviews,* 1915.

Importance of Periodic Physical Examinations.

In a recent investigation made by the Life Extention Institute a general physical survey was made of an average group of employees in commercial houses and banks in New York City. Only 3.14 per cent of these persons were found free from physical impairment, and of the remaining persons, 96.69 per cent were unaware of their impairment. Of these, 5.38 per cent were affected with organic heart trouble, 13.1 per cent with arteriosclerosis, 25.81 per cent with high of low blood pressure, 35.63 per cent had sugar, casts or albumin in the urine, 12.77 with both heart and kidney diseases, 22.22 per cent with decayed teeth or infected gums, and 16.03 per cent with faulty vision uncorrected. In 59 per cent of these cases the impairment was sufficiently serious to make immediate medical attention advisable. These figures show the importance of annual physical examinations for the purpose of detecting the earliest inroads upon health.—Abst. *Medical Review of Reviews,* 1915.

New York's Balance Sheet of Infant Life Saving.

The high dividend rate returned by public health investments is revealed in the vital statistics of New York City for 1914. The active campaign for the saving of infant lives has been rewarded by a reduction in the infant mortality rate from 167.1 per 1000 born in years 1901-5 to 94.6 per 1000 born in 1914. This rate is the lowest ever attained by any metropolitan city. Expressed in absolute figures, while the annual number of births has increased in ten years from 93,000 to 140,000 the annual number of deaths in children under the age of one year has fallen from 15,300 to 13,300. If the infant mortality rate prevailing in the years 1901-5 had prevailed in 1914 there would have been 23,500 infant deaths, or 10,200 more than actually occurred. In other words, the public health activities of the past ten years resulted in a saving of the lives of 10,000 babies in New York City in the one year of 1914.

This enormous saving of life cannot be accounted for by chance or favorable weather conditions. It is purely the result of scientific public health work. In the first place the New York Health Department inspects all death certificates and tabulates from day to day all deaths under one year. A current control sheet is always in the Director's hand showing the number of deathes and the district of the city in which they occur. This statistical work enables the department to direct its work intelligently and effectively. The actual work of the department in this field is directed to the insuring of a clean and safe milk supply and to the systematic education of mothers in matters pertaining to feeding, hygiene and sanitation. The education of the general public, the care of well babies and the treatment of sick babies are other important factors in the work of life saving. There are still thousands of infant lives needlessly lost even in New York, and with the continuation of the good work still further gains may be expected in 1915.

When New York City with its congested population so largely composed of ignorant immigrants can show a reduction of its infant mortality rate to 94.6, it is hardly creditable to the people of Ohio, that with vastly greater natural advantages in the work of saving the babies, our infant mortality rate should be 105 per 1000 of estimated population under 1 year of age in 1913. — Based on *"New York's Balance Sheet of Infant Life Saving"*, by J. H. Larson, *Statistician of the New York Milk Committee. The American City*, March, 1915.

The Growth of Medical Inspection.

Recent reports show that the medical inspection of schools is becoming quite universal and that a large number of officials is employed in this work. London alone, during 1913, employed thirty full-time and six quarter-time physicians working under the supervision of four Divisional Medical Officers. A staff of ninety nurses was employed to prepare the children for examination and assist in weighing, measuring and vision testing. The time is so divided that a physician is given six minutes for the examnation of each child or twenty-five children are examined during each session of two and a half hours. The fact that so many normal children are found and most of the defects found are of minor importance makes the examination of pupils very monotonous and uninteresting. It has been suggested that those having marked abnormalities be selected and more time given to them rather than to the routine examination of all children. It is thought that a greater variety of cases will create more interest among the examiners. Unless new interest on the part of the physicians can be secured the examinations will soon be performed in a perfunctory manner and the real object of school inspection will be defeated.—Abst. *The Sanitary Record and Municipal Engineering,* 1915.

Rural School Sanitation.

In 1911, a joint committee appointed by the National Council of Education and the Council on Health and Public Instruction of the American Medical Association decided that the most important and the most neglected field in school hygiene was the problem of rural school sanitation. In order to gain a satisfactory knowledge of existing conditions in rural schools, surveys were made and much data was collected from all available sources. This information has been carefully collated and published in Bulletin 12 of the United States Bureau of Education. This bulletin is entitled "Rural Schoolhouses and Grounds" and no doubt contains more information on this subject than any single article yet published.

The joint committee carefully studied the existing conditions and prepared a table of the minimum requirements for rural schools, considering chiefly location, construction and equipment. Parents, teachers, school boards, health officers, and those interested in the welfare of rural schools have been given a list of standard requirements which are the very least that can be established by a community. Copies of this pamphlet can be secured from Dr. Thomas D. Wood of Columbia University, New York City, or from the American Medical Association.—Abst. *J. A. M. A.*, 1915.

The Smoke Investigations of Mellon Institute.

People living under simple life conditions have few problems. The large industrial city has problems that stagger and bewilder. A very important one is the smoke problem, also known as the smoke nuisance, smoke plague, smoke evil, or smoke question. As commonly understood, it refers to black smoke given off in burning soft coal.

In England the subject has received attention for several hundred years. The problem became acute in Germany with the rise of industrialism. In both countries much has been done to abate it. For a long time there was no smoke problem in our own country because of thinly settled communities and the use of wood for fuel. The old idea that black smoke is indicative of a prosperous community is still too prevalent. Smoke spells waste and inefficiency, wear and tear of everything, including man. What we look upon as normal may be wholly abnormal. Often well meaning men proceed in a wrong way; as when the rich man founds a hospital which seeks to cure what should be prevented. Only exceptionally does a public-spirited man see the matter clearly and found an institution which seeks to prevent or reduce an evil.

So far the Mellon Institute of the University of Pittsburg has published nine bulletins upon the investigations of the smoke nuisance which it has made. Bulletin 1 gives some details of the origin of the investigation and how it is to be carried out. A staff of twenty-five specialists is engaged, of whom six give their entire time to the work. The investigation falls into two parts, analytical and remedial. Bulletin 2 gives a bibliography of smoke and smoke prevention covering 164 pages. A study of this will prevent duplication of work already well done. Bulletin 3 emphasizes the psychological aspects of the problem, by Prof. Wallin. A significant remark is the following: "Is it possible that the low esteem in which Pittsburg is held in the world of productive scholarship—a matter of occasional remark among medical men and other scientists—is due to the fact that the air which its scientists must breathe is polluted and poisoned by smoke?" The bulletin takes up the literary aspects and the aesthetic aspects of smoke pollution. Bulletin 4 presents the economic cost of the smoke nuisance to Pittsburg. It is estimated that $10,000,000 a year for Pittsburg.

In Bulletin 5 the meteorological aspects are discussed. The limit of visibility in the city on account of smoke is reduced to one-tenth of that of the open country, and active sunlight is reduced one-half. The term "smog" should be used for the black clouds that overhang cities, composed of smoke, dust and fog. We should bear in mind that there are two kinds of climate: a natural one out-of-doors, and an artificial one, in which we spend so much of our time, indoors. The tidy housewife keeps doors and windows tightly closed to exclude soot and cinders. That means re-breathing air.

Bulletin 6 contains papers on the effect of smoke on building materials, and notes especially the damages due to sulphur compounds, notably sulphuric acid. Bulletin 7 presents the effect of soot in smoke on vegetation. Smoke has a stunting and destructive effect upon plants, especially trees. One may ask, if smoky air kills trees, how long will human life itself last under such abnormal air conditions? When human beings are in ill health they move to other localities. The superficial observer who does not take into consideration this moving about, gets a very erroneous conception of the causes.

In bulletin 8 some engineering phases are concerned in one half, and the other half points out how smoke is to be prevented: (1) The history of the smoke nuisance; (2) Evidences of the smoke nuisance, illustrated by series of contrast views (The Survey shows some such)—the annual soot fall in the city reaches as high as 1,950 tons the square mile; (3) The contributing causes, such as the presence of the bituminous coal fields, a cheap fuel supply, a very smoky quality of coal, enormous industries, the location of the city in a valley, and, finally, the direction of the wind; (4) The sources of smoke in the city and district of Pittsburg, as the business section, manufacturing plants, special furnaces, railroads, river-steamboats, the innumerable chimneys of the residence district, and, finally, contractors' engines, tar and asphalt heaters, all objectionable on account of the low level at which the smoke issues; (5) Mechanical engineering survey of stationary plants in which the two following statements should appear in large letters: "The non-production of smoke is the only solution of Pittsburg's smoke problem". "There is nothing impossible or wonderful about the smokeless combustion of even Pittsburgh coal, provided the proper methods are applied and the ordinary precaution taken".

Bulletin 9 is composed of papers on the influence of smoke on health. The lungs lose their normal pink color, and in an old city resident may be black as coal. To what extent does this interfere with vital activity, likelihood of infection from tuberculosis and pneumonia. Pus infections are constant and repeated. Many men fail at 45 to 50 years. Few reach the proverbial three score and ten. There is a "pathology of the living" as well as post mortems. "The smokier the atmosphere, the more colds and bronchitis, and the more money paid to doctors".

Future reports will be made by the University of Pittsburg, which has the fund at its disposal for carrying on these investigations.—Abst. *The Survey,* 1915.

Baggage Smasher's Bachache.

A. E. Osmond, M. D.,

Assistant Pathologist, Cincinnati General Hospital.

It has been my privilege the last year or two to be connected with the Survey of Industrial Diseases, which has been made by the Ohio State Board of Health. I have become acquainted with a number of industrial diseases, some of them due to the toxins connected with the particular occupation, some due to poor light, extremes of heat, to faulty vibrations of machinery, to noises, to posture, and to the kind of muscular effort involved. The case which is presented comes under the head of muscular effort, and may be designated as a "baggage smasher's backache". The man was a porter and in his duties was required to lift and carry heavy trunks and baggage of all kinds. The history will give his symptoms and the physical findings on examination.

S. S., male, aged forty, hotel orderly.

Chief Complaint: Frequent and painful micturition, with lumbar pain.

Family History: Father, aged eighty-five years, and mother aged eighty-three, living, well. One brother, fifty-six years, living and well. One older sister died at twenty-six years in childbirth. No family history of tuberculosis or cancer.

Personal History: Measles, parotitis, pertussis, varicella and diphtheria in childhood. Gonorrhea at twenty-two years, was treated one week, has never had any return of symptoms. Denies lues. Beer about two glasses a day. Never to excess (?).

Present Illness: About four years ago had first attack of polyuria with painful micturition and pain in lumbar region. Attacks occur about once a year, but not at regular intervals; they have been increasing in severity. The last attack lasted about two weeks and occurred about one and a half years ago. Present attack began four weeks ago with gradually increasing pain during micturition and in lumbar region with polyuria.

Status Praesens: On admission December 3, 1914, a well-developed, well-nourished white male adult, age forty years. Temperature 97.2° F., pulse 76, respiration 24.

Head: Contour good. Eyes react normally. Ears and nose negative. Mouth, tongue slightly coated, teeth poor, mucous membranes normal.

Neck: No glandular enlargement.

Chest: Thoroughly well developed. Excursions good and symmetrical. Percussion note good. Auscultation: No rales, bronchial breathing more marked than usual over second right interspace anteriorly. Heart, size and sounds normal. Pulses, good and equal.

Abdomen: Wall rather thin, veins in lower quadrant are prominent. No dullness, masses, tenderness nor rigidity. Kidneys not palpable.

Extremities: Upper, negative. Lower, small scar over sacrum as from an old bed-sore (patient says he has never had one). Few small scars over both tibiae.

Genitalia: Negative.

Treatment and Course: Calomel, grain ij; salts solution, ounces ij. Urinalysis, light amber, 1034, slightly alkaline, no albumin, no sugar, no indican, small amount sediment, no pus, no casts, no crystals, no epithelium. Fracture board placed across bed under mattress at level of lumber region.

December 4—Patient slept fairly well last night. Pain in lumbar region has decreased.

December 5—Urinalysis, negative. Patient slept much better than usual last night. Lumbar pain almost gone. Amount of urine voided in twenty-four hours, ounces fifty-six.

December 6—Urinalysis (second twenty-four hours specimen): Light amber, 1036, alkaline, albumin negative (by Heller's and Esbach's tests); no sugar, small amount of sediment, no pus, no casts, carbonate crystals, no epithelium. Twenty-four hour output, ounces fifty. Fracture boards supplemented by a rolled-up sheet. Patient is sleeping all night now, and is able to hold his urine, without effort, for a half-day at a time. Pain entirely gone.

December 12—Unchanged. Urine negative. Patient assumed duties of ward orderly today.

The important facts developed by the history may be summarized as follows: An occupation demanding heavy lifting, repeated attacks of disability, backache, peculiar vesical symptoms with no abnormality in repeated urinary analyses, and a man in otherwise good physical condition.

We decided that his trouble was probably due to muscular strain and fatigue and instituted the following routine:

A few good pine planks were secured, sawed off to proper length and put under the mattress so as to rest on the bed frame and prevent all sagging of the springs. They were so placed as to support the hips and small of the back. A sheet was rolled up to form a roll about six inches in diameter and placed crosswise on the bed. The patient was instructed to lie flat on his back, and with the roll supporting him just above the sacrum. This position he assumed a couple of times a day for from thirty to sixty minutes. At no time was any medicine given.

In twenty-four hours he was much relieved, in forty-eight almost entirely recovered, and in three days he was in as good physical condition as ever. At present he is acting as orderly in the ward and seems perfectly cured.

I am somewhat at a loss for a scientific diagnosis, and can only report this as a case of "baggage-smasher's backache", which we have cured with a cotton sheet and "the soft side of a pine plank". — Abst. *Lancet Clinic.*

"KICKEN'."

The Trials of An Ohio Health Officer.

The following is no joke and is not printed as such. It was received recently at the office of the State Board of Health from an Ohio health officer and in form and contents typifies the kind of local health administration some communities of this state are living — or dying — under. The expedient of putting up a smallpox card but turning its blank side out because the officer and physician were not certain that the case should be so labelled, is certainly an original stroke:

"DEAR SIR. In reply to yours of March 13, 1915. Would say In regard to thoes Pirson From House to house they was to Famles that lived all most in the same door yards. In the First Place the doctor told me to Put up a notice but not Put the small Pox side out he wasnt shour what ailed the Pation that one case was not quarantend properly but after the case develop they was both kept in and thise has been but case started From thise. I think we have it under controle now and a nother thing you no 2 that thir is sum partes that is allway finding Falt When an officer is trying to do his duty and officer cant Pleas ever body to do his best I have Found It out years a go if you are to strick the man under quarantine is a kicken and if you hant then the other fellow Puts up a holl so this is a bout the way the matter stand

very truly yours"

REPORT OF THE HYGIENIC LABORATORIES, OHIO STATE BOARD OF HEALTH, FOR THE MONTH ENDING MARCH 31, 1915.

Diphtheria: Positive 30, negative 126, suspected 6	162
Tuberculosis: Positive 111, negative 293	404
Typhoid: Positive 16, negative 27, atypical 1	44
Rabies: Positive 5, negative 3, unsatisfactory 1	9
Miscellaneous 6	6
Total diagnostic	625
Existing water supply 40, proposed water supply 23	63
Typhoid 21, quality 33	54
Miscellaneous 2	2
Total water	119
Total number of examinations classified as above	744

REPORTED CASES OF NOTIFIABLE COMMUNICABLE DISEASES, MARCH, 1915.

	Cities.	*Villages and Townships.*	*Total.*
Tuberculosis—all forms	509	120	629
Pneumonia	486	554	1,040
Typhoid Fever	138	58	196
Diphtheria	422	158	580
Whooping Cough	242	252	494
Measles	842	1,165	2,007
Scarlet Fever	430	400	830
Chickenpox	748	332	1,080
Smallpox	135	292	429
Mumps	421	736	1,157
Gonorrhea	228	119	347
Syphilis	144	31	175
German Measles	104	50	154
Epidemic Cerebro-Spinal Meningitis	10	3	154
Acute Anterior Poliomyelitis	1	1	2
Ophthalmia Neonatorum	76	7	83
Trachoma	25	12	37
Continued Fever	1	1	2
Septic Sore Throat	3	3	6
Paratyphoid Fever	2	0	2
Chancroids	4	0	4
Tetanus	1	2	3
Trichinosis	0	1	1
Totals	4,972	4,299	9,271

COMMUNICABLE DISEASES, MARCH 1915.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
ADAMS COUNTY —										
Manchester *Vil.*								2		
Winchester *Vil.*		4								
Scott *Tp.*	1	1								
ALLEN COUNTY —										
Delphos								4		
Lima	1	8		1	2	1	4	5	1	
Beaverdam *Vil.*								1		
Marion *Tp.*		1								
Monroe		1								2
ASHLAND COUNTY —										
Londonville *Vil.*									1	
Clear Creek *Tp.*							2			
Green *Tp.*									1	
Hanover *Tp.*									1	
Mifflin *Tp.*					2					
Perry *Tp.*		3								
Vermilion *Tp.*					4					
ASHTABULA COUNTY —										
Ashtabula	6	4	2	1						
Conneaut	1			4			2	1	1	
Andover *Vil.*										2
Geneva *Vil.*		3						1		
Jefferson *Vil.*								6		
North Kingsville *Vil.*		1								
Andover *Tp.*										2
Austinburg *Tp.*		1								
Colebrook *Tp.*		1								
Denmark *Tp.*						2				
Geneva *Tp.*		2							8	
Jefferson *Tp.*		1								
Kingsville *Tp.*		3								
Monroe *Tp.*								1		
New Lyme *Tp.*		1								
Trumbull *Tp.*		1								
ATHENS COUNTY —										
Athens						18				
Nelsonville	2	3				22				
Buchtel *Vil.*						1				
Chauncey *Vil.*		8				3		2		
Glouster *Vil.*		5				10				
Trimble *Vil.*				1						
Alexander *Tp.*	1	2								
Athens *Tp.*	1					2				2
Dover *Tp.*		1				5				
Lee *Tp.*						7				
Lodi *Tp.*	1	4								
Trimble *Tp.*				3						
Troy *Tp.*		3								
Waterloo *Tp.*		1							1	
York *Tp.*		1	1							
AUGLAIZE COUNTY —										
St. Marys							1	1	22	
Wapakoneta				1						
Buckland *Vil.*										3
New Bremen *Vil.*										1
New Knoxville *Vil.*							1			
Logan *Tp.*		3								4
Noble *Tp.*	1						2			
St. Marys *Tp.*							4	1	2	
Salem *Tp.*	1									
Washington *Tp.*							2			

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
BELMONT COUNTY —										
Bellaire	1	2	3	2	3		1	13		
Martins Ferry	2	1	4	2	9		2			
Barnesville *Vil.*						4				
Belmont *Vil.*						2				
Bridgeport *Vil.*			2					1		
Brookside *Vil.*							3			
Flushing *Vil.*							3			
St. Clairsville *Vil.*		1								
Shadyside *Vil.*		3	3				2			
Colerain *Tp.*				1						
Pease *Tp.*				1						
Pultney *Tp.*		1	8					2		
Richland *Tp.*		1	1							1
Wayne *Tp.*		4			2			2		
York *Tp.*							2			
BROWN COUNTY —										
Aberdeen *Vil.*										4
Fayetteville *Vil.*		1								
Hamersville *Vil.*							8			
Sardinia *Vil.*										3
Byrd *Tp.*	1	6								
Clark *Tp.*		3					1			5
Huntington *Tp.*		6				5				
Perry *Tp.*	1	1								
Pike *Tp.*		1								
Sterling *Tp.*		4								
Union *Tp.*	1	3				1	1			8
Washington *Tp.*										1
BUTLER COUNTY —										
Hamilton	9		1		3		3	3		
Middletown	4	9	1	1	6	5	4			6
Oxford *Vil.*					2			2		
Seven Mile *Vil.*								8		1
Somerville *Vil.*	1									
Trenton *Vil.*	2									
Hanover *Tp.*				1						
Madison *Tp.*										1
Milford *Tp.*				1		1				
Morgan *Tp.*		1								
Reily *Tp.*					2					
Union *Tp.*	1	4								4
Ross *Tp.*		1			2					8
CARROLL COUNTY —										
Carrollton *Vil.*		1					2	3		
Malvern *Vil*				2				2		
Brown *Tp.*						1				
Fox *Tp.*									1	
Harrison *Tp.*							3			
Rose *Tp.*		1								
Union *Tp.*		1								
Washington *Tp.*								4		
CHAMPAIGN COUNTY —										
Urbana	3	4	1							4
Mutual *Vil.*		2						5		
St. Paris *Vil.*										4
Adams *Tp.*		2								6
Concord *Tp.*										5
Jacksoh *Tp.*	1									10
Rush *Tp.*		1								
Salem *Tp.*							1			
Union *Tp.*		2								
Urbana *Tp.*			1							

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
CLARK COUNTY —										
Springfield	13	9	3	4	1	3	5	17		17
Donnelsville *Vil.*		1								1
Bethel *Tp.*		2								
German *Tp.*		1								
Springfield *Tp.*										10
CLERMONT COUNTY —										
Amelia *Vil.*										1
Bethel *Vil.*				1			9			
Milford *Vil.*			1							
New Richmond *Vil.*			1							5
Owensville *Vil.*										15
Williamsburg *Vil.*	3									
Batavia *Tp.*								2		
Goshen *Tp.*										2
Jackson *Tp.*		1			3					
Miami *Tp.*	1									
Pierce *Tp.*										5
Stonelick *Tp.*	1	1								4
Tate *Tp.*		4					1			
Union *Tp.*	1									
Wayne *Tp.*	1	1								
Williamsburg *Tp.*		1								
BELMONT COUNTY —										
Midland *Vil.*							1			1
New Vienna *Vil.*	1	2								
Port William *Vil.*						2				
Sabina *Vil.*		1								
Wilmington *Vil.*	2		1							1
Adams *Tp.*										2
Green *Tp.*		1								
Wilson *Tp.*		1								
COLUMBIANA COUNTY —										
East Liverpool	6	8	8	4			5	6	27	1
Salem	1	2		1			1	31		
Wellsville	1	9	1	1			1	2	2	
East Palestine *Vil.*		1						1		1
Leetonia *Vil.*										1
Lisbon *Vil.*		2	1							
Washingtonville *Vil.*		2								
Butler *Tp.*		1								
Liverpool *Tp.*							2			
Perry *Tp.*							1	3		
Salem *Tp.*				3						
Wayne *Tp.*						2				
West *Tp.*							1			
COSHOCTON COUNTY —										
Coshocton				1		1	2			
Adams *Tp.*										2
Bedford *Tp.*										10
Clark *Tp.*		1								
Jackson *Tp.*										1
Linton *Tp.*				2						
Oxford *Tp.*				1			1			
Tuscarawas *Tp.*							1			3
White Eyes *Tp.*		1								50
CRAWFORD COUNTY —										
Bucyrus		1		1		3	3	6	2	1
Galion	1			3	1	1		1		
Crestline *Vil.*							2			
Dallas *Tp.*		1								
Jefferson *Tp.*				2						
Liberty *Tp.*		3						6		
Whetstone *Tp.*				1						

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
CUYAHOGA COUNTY —										
Cleveland	154	295	23	160	110	231	75	199	4	58
East Cleveland		3	1	22	1		1	7		2
Lakewood	1	1				2	2			
Berea *Vil.*								1		
Brooklyn Heights *Vil.*		1								
Cleveland Heights *Vil.*		1		1				2		
Olmstead Falls *Vil.*										1
West Park *Vil.*				2		1	1			1
Independence *Vil.*		2			4					1
Brook Park *Vil.*		1								
Brooklyn *Tp.*		1								
Euclid *Tp.*	1									
Independence *Tp.*		1								
Middleburg *Tp.*		2							2	
Olmstead *Tp.*										1
Parma *Tp.*				1						
Warrensville *Tp.*		2								
DARKE COUNTY —										
Greenville		1	1				3			
Hollansburg *Vil.*							1			
New Madison *Vil.*							1			
New Weston *Vil.*		2								
Osgood *Vil.*										15
Pitsburg *Vil.*		1								
Union City *Vil.*					9					
Versailles *Vil.*					3		20			5
Yorkshire *Vil.*							1			1
Adams *Tp.*		1			4		1			8
Butler *Tp.*									4	
Franklin *Tp.*				1						
German *Tp.*		1			5					
Greenville *Tp.*							1			
Harrison *Tp.*						1				
Monroe *Tp.*		4	1					2		
Patterson *Tp.*		2								
Richland *Tp.*					10					
Twin *Tp.*								1	1	
Van Buren *Tp.*	1									
Wabash *Tp.*										1
Wayne *Tp.*							5			
DEFIANCE COUNTY —										
Defiance			1			119	30			
Hicksville *Vil.*						1		1		2
Ney *Vil.*	1	1								
Defiance *Tp.*						10				
Farmer *Tp.*								6		2
Hicksville *Tp.*						2				
Highland *Tp.*		1			1	9				
Mark *Tp.*						1		1		
Noble *Tp.*						4				
Richland *Tp.*						3				
Tiffin *Tp.*	2	1				3	1			
Washington *Tp.*	1									
DELAWARE COUNTY —										
Delaware							5		1	
Berkshire *Tp.*		8				1				
Berlin *Tp.*		1								
Brown *Tp.*			1	1						
Concord *Tp.*							3	2		
Delaware *Tp.*							2			
Genoa *Tp.*						2	2			
Liberty *Tp.*	1						1			
Orange *Tp.*		2				6				

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
DELAWARE COUNTY—Concluded—										
Scioto *Tp.*							1			
Thompson *Tp.*		3								
Troy *Tp.*	1									
ERIE COUNTY —										
Sandusky	4	1		3				15	11	
Huron *Vil.*	1									
Florence *Tp.*	2	10				2				12
Groton *Tp.*							1		2	
Huron *Tp.*				1						
Oxford *Tp.*								13	2	
Margaretta *Tp.*		1							6	
Perkins *Tp.*									5	
FAIRFIELD COUNTY —										
Lancaster			1	2		3	3			
Baltimore *Vil.*	1									
Carroll *Vil.*		1								
Pleasantville *Vil.*		1			1					
Clear Creek *Tp.*				1						
Greenfield *Tp.*		1								
Hocking *Tp.*				1						
Violet *Tp.*		3								
FAYETTE COUNTY —										
Washington C. H.							1			1
Jefferson *Tp.*	1									
Octa *Vil.*		2								
Green *Tp.*			1				1			
Paint *Tp.*		1								
FRANKLIN COUNTY —										
Columbus	28	8	3	15	19	94	17	49		
Bexley *Vil.*		1				6	1			
Dublin *Vil.*	1									
Grove City *Vil.*								1		
Hilliards *Vil.*		3								
Westerville *Vil.*	1					83	2			
Blendon *Tp.*						5	2			
Brown *Tp.*		1					1			
Marion *Tp.*		2		1	4					
Mifflin *Tp.*				1						
Norwich *Tp.*	1	12								
Prairie *Tp.*	1				1					
Sharon *Tp.*						2				
FULTON COUNTY —										
Lyons *Vil.*										6
Wauseon *Vil.*		1				4	2			1
Clinton *Tp.*										2
Gorham *Tp.*										16
Swan Creek *Tp.*								1		
GALLIA COUNTY —										
Gallipolis								1		
Vinton *Tp.*										1
Addison *Tp.*					6			1		
Cheshire *Tp.*		2								
Clay *Tp.*		1								
Raccoon *Tp.*						17				
Springfield *Tp.*			1							
Walnut *Tp.*				1						6
GEAUGA COUNTY —										
Chardon *Vil.*				1			2			
Huntsburg *Tp.*	1									
Montville *Tp.*								2		
Troy *Tp.*		8					13			
Munson *Tp.*		2								

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.		Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
GREENE COUNTY —											
Cedarville	*Vil.*	1									
Fairfield	*Vil.*								5		
Yellow Springs	*Vil.*	2	3						2		
Bath	*Tp.*	1									
Beaver Creek	*Tp.*					1		1			1
Cedarville	*Tp.*	2									
New Jasper	*Tp.*		10								
Spring Valley	*Tp.*		1								
GUERNSEY COUNTY —											
Cambridge		1	1	6	3	2		2	2		1
Kimbolton	*Vil.*								1		
Pleasant City	*Vil.*							1			
Salesville	*Vil.*		1								
Center	*Tp.*							4			
Jackson	*Tp.*				3						
Jefferson	*Tp.*							5			
Londonderry	*Tp.*					4	1				
Valley	*Tp.*							2			
Wheeling	*Tp.*				1			2			
Wills	*Tp.*							1			
HAMILTON COUNTY —											
Cincinnati		156		6	64	10	73	45	62	8	112
Norwood		3	2			1	2	5	16		129
Addyston	*Vil.*		3					1	3		
Arlington Heights	*Vil.*										1
Cheviot	*Vil.*				2			3			
Glendale	*Vil.*								16		
Harrison	*Vil.*								1		
Lockland	*Vil.*	1	1	1							3
Madeira	*Vil.*							1			
Montgomery	*Vil.*		1								
Newtown	*Vil.*										1
North Bend	*Vil.*	1						1			
Reading	*Vil.*							2			1
Terrace Park	*Vil.*						1				
Wyoming	*Vil.*	1					1				2
Anderson	*Tp.*										1
Delhi	*Tp.*					10					
Green	*Tp.*									1	
Springfield	*Tp.*									1	1
Sycamore	*Tp.*		1								
HANCOCK COUNTY —											
Findlay		8			2		7	4	17		
Allen	*Tp.*						1	1			
Biglick	*Tp.*					5			1		
Blanchard	*Tp.*		1								
Delaware	*Tp.*					1	2				1
Jackson	*Tp.*		3								
Madison	*Tp.*							5			
Union	*Tp.*					2					
Washington	*Tp.*									2	
HARDIN COUNTY —											
Kenton										1	
Ada	*Vil.*										10
Alger	*Vil.*										1
Dunkirk	*Vil.*			1							
Ridgeway	*Vil.*									5	
Dudley	*Tp.*									5	
Liberty	*Tp.*				1						7
McDonald	*Tp.*	1								2	
Pleasant	*Tp.*									1	
Roundhead	*Tp.*									3	
Taylor Creek	*Tp.*									1	

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

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Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
HARRISON GOUNTY —										
Hopedale *Vil.*				1						
Jewett *Vil.*		1								
New Athens *Vil.*		2								
Scio *Vil.*								8		
Athens *Tp.*		1								
Freeport *Tp.*				2						
Moorefield *Tp.*		2								
North *Tp.*								3		
Nottingham *Tp.*				1						
HENRY COUNTY —										
Deshler *Vil.*				1						
Holgate *Vil.*		1								
Liberty Center *Vil.*						8				
Damascus *Tp.*	1	2				1				
Flat Rock *Tp.*						3				
Harrison *Tp.*								5		
Liberty *Tp.*		1				15				
Marion *Tp.*	1					50				
Pleasant *Tp.*	1	2				6	1			1
Washington *Tp.*						11				
HIGHLAND COUNTY —										
Greenfield *Vil.*		1			2					
Leesburg *Vil.*	1	1								1
Mowrystown *Vil.*	1									
Dodson *Tp.*							3			
Hamer *Tp.*							1			
Liberty *Tp.*	1									
Paint *Tp.*		3			25					
Penn *Tp.*	1	1								
Union *Tp.*							3			
Washington *Tp.*				3						
HOCKING COUNTY —										
Logan *Vil.*						79	1			
Murray *Vil.*	1									
Falls *Tp.*						15				
Starr *Tp.*				2		6	1			
Ward *Tp.*						6				
HOLMES COUNTY —										
Holmesville *Vil.*					2					5
Millersburg *Vil.*		2			2					
Berlin *Vil.*	1			6		1	1			
German *Tp.*							6			
Paint *Tp.*				6						
Walnut Creek *Tp.*				5			1			
HURON COUNTY —										
Bellevue	2						4	1		
Norwalk						6	1	1		
Chicago Junction *Vil.*						62	1			
New London *Vil.*										1
Greenwich *Vil.*						1				
Bronson *Tp.*						3				
Fairfield *Tp.*		1				156				
Greenfield *Tp.*						5				
Greenwich *Tp.*										3
New Haven *Tp.*						3				
Richmond *Tp.*						2				
Ripley *Tp.*		1				30				2
Wakeman *Tp.*		1						3		
JACKSON COUNTY —										
Oak Hill *Vil.*			1						7	
Franklin *Tp.*							1			
Jackson *Tp.*		2								4
Jefferson *Tp.*									13	
Liberty *Tp.*				1						
Scioto *Tp.*		1	1							

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
JEFFERSON COUNTY —										
Steubenville	2	4	5	3	1	1	3			
Brilliant *Vil.*				1						
Mingo Junction *Vil.*			1	1			1	2		
Smithfield *Vil.*							1			1
Toronto *Vil.*		1								
Island Creek *Tp.*		1	1							
Mt. Pleasant *Tp.*				2			1			
Saline *Tp.*				3			1	5		
Springfield *Tp.*							1			
Wells *Tp.*								5		3
KNOX COUNTY —										
Mt. Vernon				1		2	3			
Centerburg *Vil.*		1			1	1				
Berlin *Tp.*	1						1			
Brown *Tp.*		2								
Union *Tp.*		2								
Wayne *Tp.*							1			
LAKE COUNTY —										
Painesville	1			1			2		1	2
Perry *Tp.*						1				
LAWRENCE COUNTY —										
Ironton		2	15	1		58		10		1
Coal Grove *Vil.*		1					1			
South Point *Vil.*		2								
Fayette *Tp.*	1	1						1		
Washington *Tp.*									1	10
LICKING COUNTY —										
Newark	6		1		3	2		2	1	
Johnstown *Vil.*						1				
Utica *Vil.*						1				
Burlington *Vil.*						1	1			
Harrison *Tp.*				1						
Jersey *Tp.*		4								
Licking *Tp.*						29				
Madison *Tp.*					1	1		2		
Monroe *Tp.*							1			
Newark *Tp.*				1						
Perry *Tp.*								3		
Union *Tp.*						6				1
LOGAN COUNTY —										
Bellefontaine	2	4				1	2	24		1
Belle Center *Vil.*	1						1			
DeGraff *Vil.*									2	
Lakeview *Vil.*								1		
Rushsylvania *Vil.*								4	1	
Bloomfield *Tp.*							1			
Lake *Tp.*		2				1				
McArthur *Tp.*		4								
Monroe *Tp.*								1		
Pleasant *Tp.*		5								
Richland *Tp.*				2						
Rush Creek *Tp.*									6	
Zane *Tp.*	1	3					7	5		
LORAIN COUNTY —										
Elyria				1	18	37	5	1		2
Lorain	7	7	1	4			1	3		
Grafton *Vil.*								5		
LeGrange *Vil.*					3		1			
Oberlin *Vil.*	1	2			5	3				
Avon *Tp.*					2	2				
Carlisle *Tp.*				2			2	3		
Columbia *Tp.*						4				

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
LORAIN COUNTY—Concluded—										
Eaton .... *Tp.*		2				8				
Grafton .... *Tp.*			1		5	10				
La Grange .... *Tp.*		2			2					
Ridgeville .... *Tp.*		3				1				
LUCAS COUNTY —										
Toledo	25	4	19	24	16	48	20	91	7	3
Waterville .... *Vil.*							3			
Adams .... *Tp.*							3			
Monclova .... *Tp.*							1			
Washington .... *Tp.*	1				3	1	3			
MADISON COUNTY —										
Mt Sterling .... *Vil.*	1	1			4					2
Plain City .... *Vil.*	1			1						
West Jefferson .... *V.l.*					10					
Fairfield .... *Tp.*			1							
Oak Run .... *Tp.*		1								
Pike .... *Tp.*		1								
MAHONING COUNTY —										
Youngstown	18	45	10	13	5	11	12	11		28
Beloit .... *Vil.*		2						1		
East Youngstown .... *Vil.*	3	6								3
Lowellville .... *Vil.*							2			
Poland .... *Vil.*		2								10
Sebring .... *Vil.*		2								
Austintown .... *Tp.*		2		1						
Beaver .... *Tp.*		1								1
Berlin .... *Tp.*							1			12
Boardman .... *Tp.*		2	1							40
Canfield .... *Tp.*						1				
Coitsville .... *Tp.*	1	1	1			2				
Ellsworth .... *Tp.*				1						1
Green .... *Tp.*								1		
Milton .... *Tp.*		1					1			
Smith .... *Tp.*				1						
Springfield .... *Tp.*		1								
MARION COUNTY —										
Marion	1		1	4			1	5		
Larue .... *Vil.*									2	
Morral .... *Vil.*		2							10	
Prospect .... *Vil.*						3				
Waldo .... *Vil.*										3
Bowling Green .... *Tp.*									2	
Grand .... *Tp.*									1	
Marion .... *Tp.*				1						
Montgomery .... *Tp.*		6							1	
Tully .... *Tp.*		1								
Waldo .... *Tp.*								1		
MEDINA COUNTY —										
Brunswick .... *Tp.*		3					1			
Granger .... *Tp.*		4								
Hinckley .... *Tp.*		1				1				
Homer .... *Tp.*							3			
Litchfield .... *Tp.*		1								
Liverpool .... *Tp.*					1	1		2		
MEIGS COUNTY —										
Middleport .... *Vil.*						2		3		
Rutland .... *Vil.*	1	2								
Bedford .... *Tp.*		4				3				
Orange .... *Tp.*		2								
Rutland .... *Tp.*		2								
Salem .... *Tp.*		3								2

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
MERCER COUNTY —										
Celina *Vil.*			1	2						
Coldwater *Vil.*				7						
Montezuma *Vil.*							2			
Rockford *Vil.*						4		15		
St. Henry *Vil.*		2								1
Butler *Tp.*			1				1			
Gibson *Tp.*		1								
Granville *Tp.*		4					1			1
Jefferson *Tp.*				3						
Marion *Tp.*			1				6	1		6
Recovery *Tp.*		1					1			
Union *Tp.*	1									
MIAMI COUNTY —										
Piqua		5		7	10		4	2		4
Troy				1						
Bradford *Vil.*				1						1
Covington *Vil.*								1		
Pleasant Hill *Vil.*			1							
Tippecanoe City *Vil.*						1				
West Milton *Vil.*							2			
Brown *Tp.*		2					3			1
Newton *Tp.*			1							
Spring Creek *Tp.*			1							
Washington *Tp.*					3					
MONROE COUNTY —										
Antioch *Vil.*							1			
Jerusalem *Vil.*	1									
Green *Tp.*		2								
Ohio *Tp.*	1	2								
MONTGOMERY COUNTY —										
Dayton	21	20	8	13	6	69	42	55		25
Miamisburg *Vil.*							5	3		1
West Carrollton *Vil.*								8		
German *Tp.*							3	3		4
Jackson *Tp.*							4			
Jefferson *Tp.*					3		3	1		
Mad River *Tp.*							5			
Perry *Tp.*	2	3			2		1			
Van Buren *Tp.*	1	1								
Washington *Tp.*							1			
Wayne *Tp.*										5
MORGAN COUNTY —										
Bloom *Tp.*										3
Center *Tp.*										6
Manchester *Tp.*										72
Union *Tp.*								6		
MORROW COUNTY —										
Sparta *Vil.*		1				1				
Bennington *Tp.*		1								
Gilead *Tp.*			1							
South Bloomfield *Tp.*		2				15				
Washington *Tp.*								2		
MUSKINGUM COUNTY —										
Zanesville		4	2	4	2	1	2	4		
Frazeysburg *Vil.*	1	1								
Philo *Vil.*							1			
South Zanesville *Vil.*		2								
Cass *Tp.*						1				
Falls *Tp.*							1			
Harrison *Tp.*	1									
Meigs *Tp.*	4	2								
Salt Creek *Tp.*			1							
Union *Tp.*					2					
Wayne *Tp.*					3					

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
NOBLE COUNTY —										
Berne *Vil.*	1									
Sarahsville *Vil.*							1			
Beaver *Tp.*		1								
Enoch *Tp.*		2								
Sharon *Tp.*										4
OTTAWA COUNTY —										
Marblehead *Vil.*	1				1					
Oak Harbor *Vil.*								2		
Port Clinton *Vil.*		1								
Benton *Tp.*							4			
Clay *Tp.*	1									
Erie *Tp.*		3								4
Portage *Tp.*							1			
Salem *Tp.*										8
PAULDING COUNTY —										
Antwerp *Vil.*		1								1
Paulding *Vil.*						4			15	1
Payne *Vil.*						1				
Auglaize *Tp.*						1		1	19	
Benton *Tp.*						25				
Carryall *Tp.*					1					
Emerald *Tp.*						1			25	1
Jackson *Tp.*						2			10	
Latty *Tp.*									2	
Paulding *Tp.*									9	
Washington *Tp.*		2							40	
PERRY COUNTY —										
Crooksville *Vil.*		11		1			2			
Hemlock *Vil.*		2						20		
Junction City *Vil.*	1									
New Lexington *Vil.*	1	2								
New Straightsville *Vil.*		1				5				
Rendville *Vil.*	1	1						2		
Shawnee *Vil*		1		1						
Thornville *Vil*		1	1						1	
Harrison *Tp.*		1								
Jackson *Tp.*	2									
Salt Lick *Tp.*		2						5		
PICKAWAY COUNTY —										
Circleville		1			1		1			
Darby *Tp.*					8					
Jackson *Tp.*							1			
Muhlenburg *Tp.*		3								
Perry *Tp.*							1			
Walnut *Tp.*					2					
PIKE COUNTY —										
Beaver *Tp.*		1								
Camp Creek *Tp.*	1									
Jackson *Tp.*							1			
Pebble *Tp.*	1			1						9
Perry *Tp.*		6								
PORTAGE COUNTY —										
Ravenna					1		2			
Hiram *Vil.*		5								
Kent *Vil.*	1									
Mantua *Vil.*							5			
Aurora *Tp.*		1								
Brimfield *Tp.*			1							
Charlestown *Tp.*					1					
Deerfield *Tp.*		1								
Edinburg *Tp.*						1	1			2
Hiram *Tp.*								5		
Mantua *Tp.*							2			

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
PORTAGE COUNTY—Concluded—										
Nelson .... *Tp.*						2				
Shalersville .... *Tp.*		2								
Suffield .... *Tp.*	1									
PREBLE COUNTY —										
West Manchester .... *Vil.*		1					1			
Dixon .... *Tp.*						9	1			
Jefferson .... *Tp.*		2			8					2
Somers .... *Tp.*					4					
Twin .... *Tp.*							1			
Washington .... *Tp.*						4				
PUTNAM COUNTY —										
Belmore .... *Vil.*		2								
Columbus Grove .... *Vil*	1	4				13				
Glandorf .... *Vil.*		3								
Leipsic .... *Vil.*							1			
Pandora .... *Vil.*		5				1				
Liberty .... *Tp.*							6			
Palmer .... *Tp.*	2	4								
Pleasant .... *Tp.*		2				36				1
Riley .... *Tp.*		5				2				
Sugar Creek .... *Tp.*						3	3			
RICHLAND COUNTY —										
Mansfield	2		1	4	2	2		13	1	
Lexington .... *Vil.*							1			
Shelby .... *Vil.*		1		1						
Shiloh .... *Vil.*		1								2
Mifflin .... *Tp.*				10						
ROSS COUNTY —										
Chillicothe	3	4		3				1		
Clarksburg .... *Vil.*					2					
Kingston .... *Vil.*						1				
South Salem .... *Vil.*										3
Deerfield .... *Tp.*							1			
Huntington .... *Tp.*		1								5
Paint .... *Tp.*	1	2								
Paxton .... *Tp.*	1									
Scioto .... *Tp.*	1	1			2			2		
Twin .... *Tp.*	2	2								10
SANDUSKY COUNTY —										
Fremont	1	2					2	9		
Clyde .... *Vil.*							3			
Woodville .... *Vil.*								1		
Ballville .... *Vil.*						1		1		
Green Creek .... *Tp.*				1			3			
SCIOTO COUNTY —										
Portsmouth	2		1	4			7	4		
New Boston .... *Vil.*				1						
Bloom .... *Tp.*									23	
Brush Creek .... *Tp.*		1		3		1				
Clay .... *Tp.*				1			1			
Green .... *Tp.*		2								
Madison .... *Tp.*						1				
Nile .... *Tp.*	1									
Porter .... *Tp.*		1								
Vernon .... *Tp.*		1								
SENECA COUNTY —										
Fostoria		1		3			8	2	24	
Attica .... *Vil.*					4					
Bloomville .... *Vil.*	1	4								
Adams .... *Tp.*	1						1	2		
Big Spring .... *Tp.*							2			
Clinton .... *Tp.*				1						

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
SENECA COUNTY—Concluded—										
Jackson Tp.		1								
Liberty Tp.							1			
London Tp.				1					1	
Pleasant Tp.								6		
Scipio Tp.										2
Thompson Tp.						4	15			
SHELBY COUNTY —										
Sidney			1							
Franklin Tp.							1			
Turtle Creek Tp.										4
Washington Tp.		2			2					
STARK COUNTY —										
Alliance		1		1		6	11	1		
Canton	5	6		4	7	4	41	29	19	18
Massillon						8				
Brewster Vil.		1								
Canal Fulton Vil.							2			
Limaville Vil.								1		
Louisville Vil.							2	4		
New Berlin Vil.			1							
Osnaburg Vil.							3			
Waynesburg Vil.								1		
Canton Tp.					1		1		1	
Nimishillen Tp.		1	1							
Osnaburg Tp.							1			
Paris Tp.		2								
Perry Tp.				5		2	1			
Pike Tp.		1							9	
Plain Tp.									1	
Sandy Tp.				1						
Sugar Creek Tp.						1				
Tuscarawas Tp.					6					
SUMMIT COUNTY —										
Akron	1		3	23	2		19	20		1
Barberton							1	1		
Cuyahoga Falls Vil.		2	2					3		
Kenmore Vil.							2			
Mogadore Vil.		1								
Franklin Tp.							1			
Green Tp.							1			
Portage Tp.				2			1		2	
Richfield Tp.						1				
Springfield Tp.								3		
Tallmadge Tp.				1					1	
TRUMBULL COUNTY —										
Niles	2	5	3	4						1
Warren	2	8					1			
Girard Vil.		4					1			
Orangeville Vil.										8
Bazetta Tp.	1					4		7		5
Braceville Tp.						5				
Bristol Tp.		4								
Brookfield Tp.									1	
Johnston Tp.							4			
Kinsman Tp.			2							
Liberty Tp.							1			
Lordstown Tp.								1		10
Mesopotamia Tp.		3								
Newton Tp.	1									
Southington Tp.		1								
Weathersfield Tp.							1			

COMMUNICABLE DISEASES, MARCH 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.	Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
TUSCARAWAS COUNTY —										
Canal Dover			1	1			4			
New Philadelphia	3	1					2			
Baltic *Vil.*									10	
Bolivar *Vil.*								3		
New Comerstown *Vil.*							6			
Strasburg *Vil.*	1									
Sugar Creek *Tp.*									7	
Uhrichsville *Vil.*				1						
Auburn *Tp.*							8			
Clay *Tp.*	1									
Fairfield *Tp.*							2			
Franklin *Tp.*			1							1
Lawrence *Tp.*			1				1			1
Mill *Tp.*	2			1						
Oxford *Tp.*							9			
Perry *Tp.*		1								
Rush *Tp.*		1								
Sandy *Tp.*		1				2				
Warren *Tp.*								1		
Washington *Tp.*				5						
York *Tp.*		1								
UNION COUN Y —										
Marysville *Vil.*							1			
Milford Center *Vil.*						1				
Richwood *Vil.*	1									
Allen *Tp.*	1			1			1	7		
Claibourne *Tp.*		1								
Jackson *Tp.*							1			
Jerome *Tp.*							1			
Liberty *Tp.*					1		1	1		
Mill Creek *Tp.*						1				
Paris *Tp.*							1			
Union *Tp.*		1		1			2			
Washington *Tp.*							5			
VAN WERT COUNTY —										
Van Wert	1			1		1	2		1	
Convoy *Vil.*										1
Ohio City *Vil.*	1					28	1			
Willshire *Vil.*						4				
Wren *Vil.*							1			
Harrison *Tp.*						18		3		5
Liberty *Tp.*				1		36	8			
Willshire *Tp.*						15				
York *Tp.*						15				
VINTON COUNTY —										
Hamden *Vil.*		2								
McArthur *Vil.*							1			1
Wilkesville *Vil.*		1								
Brown *Tp.*						9				
Clinton *Tp.*	1	2								
Eagle *Tp.*		1								
Knox *Tp.*					7	1				
Madison *Tp.*					3					
Swan *Tp.*				2		3				
Vinton *Tp.*		1								
WARREN COUNTY —										
Lebanon *Vil.*					1			6		82
Morrow *Vil.*										1
Springboro *Vil.*										7
Waynesville *Vil.*						6		1		3
Hamilton *Tp.*						1				4
Massie *Tp.*						6				
Turtle Creek *Tp.*								1		2
Wayne *Tp.*					6	36				6

COMMUNICABLE DISEASES, MARCH 1915 — Concluded.

This table records cases of specified diseases reported to the State Board of Health for the month of March 1915.

Health District.		Tuberculosis (all forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
WASHINGTON COUNTY —											
Marietta		1	1		1						5
Beverly	*Vil.*										1
New Matamoras	*Vil.*			1	1						
Belpre	*Tp.*										2
Dunham	*Tp.*					4					
Muskingum	*Tp.*						2				
Salem	*Tp.*								15		
Warren	*Tp.*				1	1			1		
Wesley	*Tp.*						3				
WAYNE COUNTY —											
Creston	*Vil.*						1				
Dayton	*Vil.*				1						
Rittman	*Vil.*						4			5	
Chester	*Tp.*							2		1	
Clinton	*Tp.*								1		
Greene	*Tp.*		3				7		2		
Milton	*Tp.*		2				5				
Paint	*Tp.*		1		1						
Salt Creek	*Tp.*	1	8		2						
Sugar Creek	*Tp.*		1				4				
Wayne	*Tp.*							2			
WILLIAMS COUNTY —											
Alvordton	*Vil.*		1								
Edgerton	*Vil.*										1
Montpelier	*Vil.*					1			5		3
Pioneer	*Vil.*						17				
Stryker	*Vil.*							3			
Bridgewater	*Tp.*							1			
Center	*Tp.*		10								
Florence	*Tp.*	1					7				4
Northwest	*Tp.*					15					
St. Joseph	*Tp.*										4
WOOD COUNTY —											
Bowling Green					1					1	
Bairdstown	*Vil.*							1			
Cygnet	*Vil.*							2			
North Baltimore	*Vil.*		2								
Grand Rapids	*Vil.*						4				
Perrysburg	*Vil.*			1							
Portage	*Vil.*		2	1			1				1
Walbridge	*Vil.*					4					
Center	*Tp.*				3			1			
Henry	*Tp.*						1				
Middleton	*Tp.*				1						
Montgomery	*Tp.*		1					1	2		
Plain	*Tp.*							1			
Portage	*Tp.*		1								
Ross	*Tp.*					1					1
Troy	*Tp.*										15
Washington	*Tp.*							3			
WYANDOT COUNTY —											
Carey	*Vil.*				3					1	
Sycamore	*Vil.*				1						
Upper Sandusky	*Vil.*			3			1		2		
Eden	*Tp.*									2	
Marseilles	*Tp.*								2		
Ridge	*Tp.*									4	

NUMBER AND DISTRIBUTION BY COUNTIES OF REPORTED CASES OF COMMUNICABLE DISEASES NOT INCLUDED IN THE GENERAL TABLE, MARCH, 1915.

County.	Gonorrhea.	Syphilis.	German Measles.	Epidemic Cerebro Spinal Meningitis.	Acute Anterior Poliomyelitis	Ophthalmia Neonatorum.	Trachoma.	Other Notifiable Diseases.
Adams							5	
Allen	2					1		
Ashland	4							
Ashtabula	3	2		1				*a* 1
Athens	8	7						
Belmont	4	3		1				
Brown		1						*b* 1
Butler	11	3				1		
Carroll	1							
Champaign	1							
Clark	6	2					1	
Clermont	3	1						
Clinton	2							
Columbiana	3	1	5					*c* 1
Crawford	1		1					
Cuyahoga	7	11	1	3		54	6	
Darke	1	1						*b* 1
Defiance	4		4					
Delaware	3		1					
Erie	6	5				1	1	
Fairfield	1							
Fayette	1	1	1					
Franklin	22	5				1		*d* 4
Fulton	3							
Gallia	1							
Geauga	2		7					
Greene	2		1					
Guernsey	3	1				1		
Hamilton	14	10	93	4		4	9	
Hardin	3		1			1		
Harrison		1						
Henry	7	2						
Highland	3							
Holmes			1					
Huron				1				
Jefferson	9	3	1					*b* 1
Knox	1			1				
Lawrence	2		5		1	1	1	
Licking	4	3						
Logan	2							
Lorain	4	2					1	*e* 1
Lucas	88	80		1	1	5		*f* 3
Madison	2							*g* 1
Mahoning	24	7	13			6	7	*b* 1
Marion	8	1						
Meigs			1					
Miami	1							
Montgomery	3	3	1	1		1	1	*c* 1
Muskingum	4		1			1		
Perry	6	6	5			1		
Pickaway	2							
Portage	3	1	2			1		
Putnam	4							
Richland	6	1						*e* 1
Ross	8	3						
Scioto							1	
Seneca	4	1						
Shelby	1							
Stark	2	2	3					
Summit	1	1				1	4	*a* 1
Trumbull	6					2		
Tuscarawas	3	1						

NUMBER AND DISTRIBUTION BY COUNTIES OF REPORTED CASES OF COMMUNICABLE DISEASES NOT INCLUDED IN THE GENERAL TABLE, MARCH, 1915 — Concluded.

County.	Gonorrhea.	Syphilis.	German Measles.	Epidemic Cerebro Spinal Meningitis.	Acute Anterior Poliomyelitis	Ophthalmia Neonatorum.	Trachoma.	Other Notifiable Diseases.
Union	4	......	......	......	......	......	......	......
Vinton	......	1	......	......	......	......	......	......
Warren	3	......	......	......	......	......	......	......
Washington	8	1	5	......	......	......	......	......
Williams	2	......	......	......	......	......	......	......
Wood	......	1	1	......	......	......	......	......

a Continued Fever.
b Septic Sore Throat.
c Paratyphoid Fever.
d Chancroids 3, Tetanus 1.
e Tetanus.
f Chancroids 1, Septic Sore Throat 2.
g Trichinosis.

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THE PROBLEM OF INFANT MORTALITY IN CITIES.

FRANK G. BOUDREAU, M. D., C. M.,
Director, Division of Communicable Diseases,
and
SARA KERR, B. A.,
Assistant Statistician.

Perhaps the most striking fact in the record of vital statistics in Ohio is that one-sixth of all deaths which occur in the state are those of infants under one year of age. During the five-year period* which ended December 31, 1913, there was a total of 322,458 deaths at all age periods. Of this total, 52,730, or roughly one-sixth, were contributed by infants under one year of age. Less striking is the fact that during the same period 73,488 deaths of children under five years occurred. It is only within recent years that the subject of infant mortality has aroused world-wide interest. Even today little provision for infant-saving programs is made by legislators, councilmen and others who have charge of the public purse. In Ohio we have the curious spectacle of thousands of dollars expended for flood-prevention, for animal diseases, for hospitals and prisons, and for various and sundry purposes which affect the health and happiness of the citizens of Ohio only indirectly; but Ohio, as a state, has so far refused to recognize that the wholesale slaughter of infants is a matter of grave concern and vital importance to every citizen. The cities of Ohio have not all been so negligent, although the work done so far

TABLE 1.

NUMBER OF DEATHS IN OHIO DURING THE FIVE YEARS 1909-1913, FOR CHILDREN UNDER ONE YEAR AND UNDER FIVE YEARS OF AGE AND FOR ALL AGE PERIODS.

Age Period.	Number of Deaths.					
	1909.	1910.	1911.	1912.	1913.	Total.
Under one year..........	10,396	11,463	9,922	9,935	11,014	52,730
Under five years.........	14,039	15,984	13,747	14,105	15,613	73,488
All age periods...........	60,731	65,532	63,385	65,411	68,399	322,458

---

* This period is chosen inasmuch as statistics are not available prior to or succeeding the years 1909, 1913 respectively.

has made practically no impression, so vast is the problem and so complicated the conditions. The first fact worthy of record which strikes one who considers the problem of infant mortality in Ohio, is that no just comparison can be made or accurate conclusions drawn, so incomplete is birth registration. As an accurate knowledge of a problem is the only logical basis for its solution, so one of the first things to be done in Ohio is to perfect the collection of birth statistics by enforcing prompt birth registration. The only proper infant mortality rate is one in which is shown the ratio of deaths of infants to living births. If the number of births in the state is not known, the number of deaths of infants assumes an unjust proportion, either less or greater than the facts warrant. Lacking complete birth statistics we have established a more unsatisfactory but still useful comparison, and find that deaths of infants under one year of age comprise roughly one-sixth of the total deaths of all ages and from all causes.

The infant comes into the world more susceptible than the adult to unfavorable influences which may surround it. A complete and sudden change of environment has occurred. The tissues and organs are less strong and resistant than those of the adult, and implanted pathogenic organisms find, as a rule, a ready soil. On the other hand, the babe, for obvious reasons, lives in a circumscribed world and is less liable than the adult to diseases transmitted by the accident of contact. With its mother's milk the infant absorbs a certain degree of immunity to many dangerous diseases so that for the first six months of its life it enjoys a comparative freedom from many of the acute children's diseases. Normal infants of normal mothers should not contribute such an unjust proportion of the total deaths at all ages. The infant born under less favorable circumstances is a different proposition, and the first significant fact in connection with the causes of infant mortality is that infants who are breast-fed furnish a much smaller proportion of the deaths than do those who are artificially fed. In Munich in 1903, of 4,000 infant deaths, 83 per cent occurred among those artificially fed. In Berlin in a period of five years, only 9 per cent of the infant mortality occurred among breast-fed babies. An interesting comparison is that made by Armstrong, who found that in a group of 1,000 children only 8 per cent of those wholly breast-fed died in the first year, while over 22 per cent of those wholly bottle-fed died in the same period. Statistics bearing on this point could be multiplied, and all would tend to show that if all infants were breast-fed a great saving in life would result.

Let us look more closely at the records and assigned causes of infant deaths in Ohio. In Table 2, the deaths of children under one year of age for the period 1909-1913 are shown, from all causes and from specified groups of causes. The first striking fact in this table is that nearly one-third of all deaths in this age-group is included under the heading "early infancy." Significant in this connection is the statement that over one-third (37%) of all deaths under one year of age, in the registration area in 1910, occurred during the first month. The factor, death in early infancy, depends upon the health of the parents, economic conditions, and antenatal care of the child, as well as the skill of the obstetrician. The second striking fact in connection with this table (2) is that deaths from diseases of the digestive system comprise over one-fourth of deaths from all causes, namely 14,658. Deaths from diseases of the respiratory system form the next largest group, while general diseases caused the death of 5,059 infants. A curious occurrence is to be noted under the title "external" causes.

TABLE 2.

NUMBER OF DEATHS OF CHILDREN UNDER ONE YEAR OF AGE IN OHIO 1909-1913, INCLUSIVE, FROM ALL CAUSES AND FROM SPECIFIED GROUPS OF CAUSES.

Cause of Death.	Number of Deaths.					
	1909.	1910.	1911.	1912.	1913.	Total.
All Causes	10,396	11,463	9,922	9,935	11,014	52,730
1. General Diseases	860	1,161	1,075	867	1,096	5,059
2. Diseases of Nervous System	694	573	384	330	301	2,282
3. Diseases of Circulatory System	98	115	119	56	65	453
4. Diseases of Respiratory System	1,547	1,749	1,318	1,440	1,521	7,575
5. Diseases of Digestive System	2,793	3,544	2,582	2,636	3,103	14,658
6. Diseases of Genito-Urinary System	69	59	73	54	43	298
8. Diseases of the Skin	28	46	38	32	35	179
9. Diseases of the Bones	22	23	7	6	9	67
10. Malformations	604	679	703	732	746	3,464
11. Early Infancy	2,940	2,891	3,296	3,504	3,735	16,366
13. External Causes	434	439	198	150	230	1,451
14. Ill-defined and Unknown Causes	307	184	129	128	130	878

Many of the deaths recorded under this heading are said to be due to deleterious gases, while burns are a comparatively unimportant factor. Deaths due to unknown causes have greatly decreased since 1909, showing that the present system of registration is becoming more efficient every year. In Table 3 in a total of 73,488 deaths of children under five years of age, the largest group is that comprising diseases of the digestive system, particularly diarrhœa and enteritis. The group including diseases of early infancy, particularly premature birth and congenital disability was the cause of the next highest total, 46,418 deaths. In children under five years of age 11,678, or more than one-seventh of the total deaths from all causes at this age, were caused by diseases of the respiratory system, particularly bronchitis and pneumonia. It would seem from a consideration of these facts, that the infant is most susceptible to derangements of the digestive system, and it must not be forgotten that many deaths from

TABLE 3.

NUMBER OF DEATHS OF CHILDREN UNDER FIVE YEARS OF AGE IN OHIO, 1909-1913, INCLUSIVE, FROM ALL CAUSES AND FROM SPECIFIED GROUPS OF CAUSES.

Cause.	Number of Deaths.					
	1909.	1910.	1911.	1912.	1913.	Total.
All Causes	14,039	15,984	13,747	14,105	15,613	73,488
General Diseases, Particularly Tuberculosis, Diphtheria and Whooping Cough	1,886	2,849	2,486	2,416	2,900	12,537
Diseases of Respiratory System, Particularly Bronchitis and Pneumonia	2,412	2,565	2,009	2,292	2,400	11,678
Diseases of Digestive System, Particularly Diarrhea and Enteritis	3,759	4,709	3,490	3,593	4,228	19,779
Early Infancy, Particularly Premature Birth and Congenital Disability	2,952	2,893	3,311	3,512	3,750	16,418
Diseases of Nervous System, Particularly Convulsions, Infantile Paralysis and Meningitis	1,014	947	676	598	522	3,757
All Other Causes, Particularly Malformations and Accidents	2,016	2,021	1,775	1,694	1,813	9,319

convulsions which are here included in diseases of the nervous system, are caused by disturbances of digestion and by poisons entering the body through the alimentary tract. Whooping cough, tuberculosis, measles, and diphtheria in the order named are the more important of the general diseases which have caused annually in Ohio the deaths of over 2,000 children under five years of age. It is strange to think that practically no provision is made for the prevention of measles and whooping cough in this state. In Table 4 is shown the number of deaths from ten specified communicable diseases for all ages and for children under one and under five years of age during the five years 1909-1913, inclusive. In general these diseases caused as many deaths in children under five years of age as at all other ages combined, and one-sixth of the total deaths during this period occurred in children under one year. Nearly two-thirds of the deaths at all ages from diphtheria occurred between the end of the first and the end of the fifth year. Of course, diphtheria is most fatal at this tender age, but it would seem that the disease is most prevalent in Ohio among those under school age. Three-quarters of all deaths from measles occurred in children under five years of age, and of these deaths, nearly one-third occurred during

TABLE 4.

NUMBER OF DEATHS IN OHIO DURING THE FIVE YEARS 1909-1913, FROM TEN SPECIFIED COMMUNICABLE DISEASES FOR ALL AGES AND FOR CHILDREN UNDER ONE YEAR AND UNDER FIVE YEARS OF AGE.

Disease.	Number of Deaths, 1909-1913 Inc.		
	Under 1 yr.	Under 5 yrs.	All Ages.
Diphtheria	2,221	2,187	4,070
Gonococcus Infection	18	20	78
Measles	536	1,846	2,443
Meningitis, Epidemic Cerebrospinal	129	330	610
*Poliomyelitis, Acute	84	296	427
Scarlet Fever	80	817	1,664
Smallpox	12	20	37
Syphilis	791	840	1,507
Typhoid Fever	36	334	5,765
Whooping Cough	1,397	2,451	2,545
Total	3,304	9,141	19,146

*Figures given for four years, 1910-1913.

the first twelve months of life. In scarlet fever half of the deaths occurred under five years of age. In syphilis nearly half of the deaths at all ages occurred among infants during the first year of life. Whooping cough was most fatal to those under one year of age, over half the deaths occurring among this age-group. Nearly all the deaths from diphtheria are included in the age-group, under five years. If any lesson is to be learned from these records it is that the old idea that children should have these diseases young is absolute folly and criminal thoughtlessness. It has been repeatedly shown, and Ohio statistics bear this out, that the younger the child when attacked, the more liable is the attack to prove fatal. Tuberculosis, which is not included in Table 4, has caused within the five-year period 958 deaths of infants and 2,230 of children under five years of age, or annually, approximately 200 infant deaths and more than twice that number of deaths of children under five years.

From a consideration of the foregoing tables it is obvious that diseases of the digestive system play a large part in the causation of infant mortality. An analysis of these diseases in Table 5 shows that of a total of 14,658 deaths caused by diseases of the digestive

TABLE 5.

NUMBER OF DEATHS OF CHILDREN UNDER ONE YEAR OF AGE IN OHIO, 1909-1913, INCLUSIVE, FROM DISEASES OF THE DIGESTIVE SYSTEM.

Cause of Death.	Number of Deaths.					
	1909.	1910.	1911.	1912.	1913.	Total.
Diseases of Mouth, Annexa and Pharynx......	27	46	27	21	24	415
Diseases of Stomach (Cancer Excepted).....	172	124	227	149	162	834
Diarrhea and Enteritis....	2,421	3,224	2,116	2,367	2,828	13,036
Appendicitis and Peritonitis	21	27	7	12	8	75
Hernia and Intestinal Obstruction	99	74	79	62	60	374
Other Diseases of Intestines	32	26	21	9	10	98
Diseases of the Liver....	21	22	24	15	10	92
Other Diseases of Digestive System	....	1	1	1	1	4
Total	2,793	3,544	2,582	2,636	3,103	14,658

system, 13,036 were due to diarrhœa and enteritis, other causes being practically negligible.

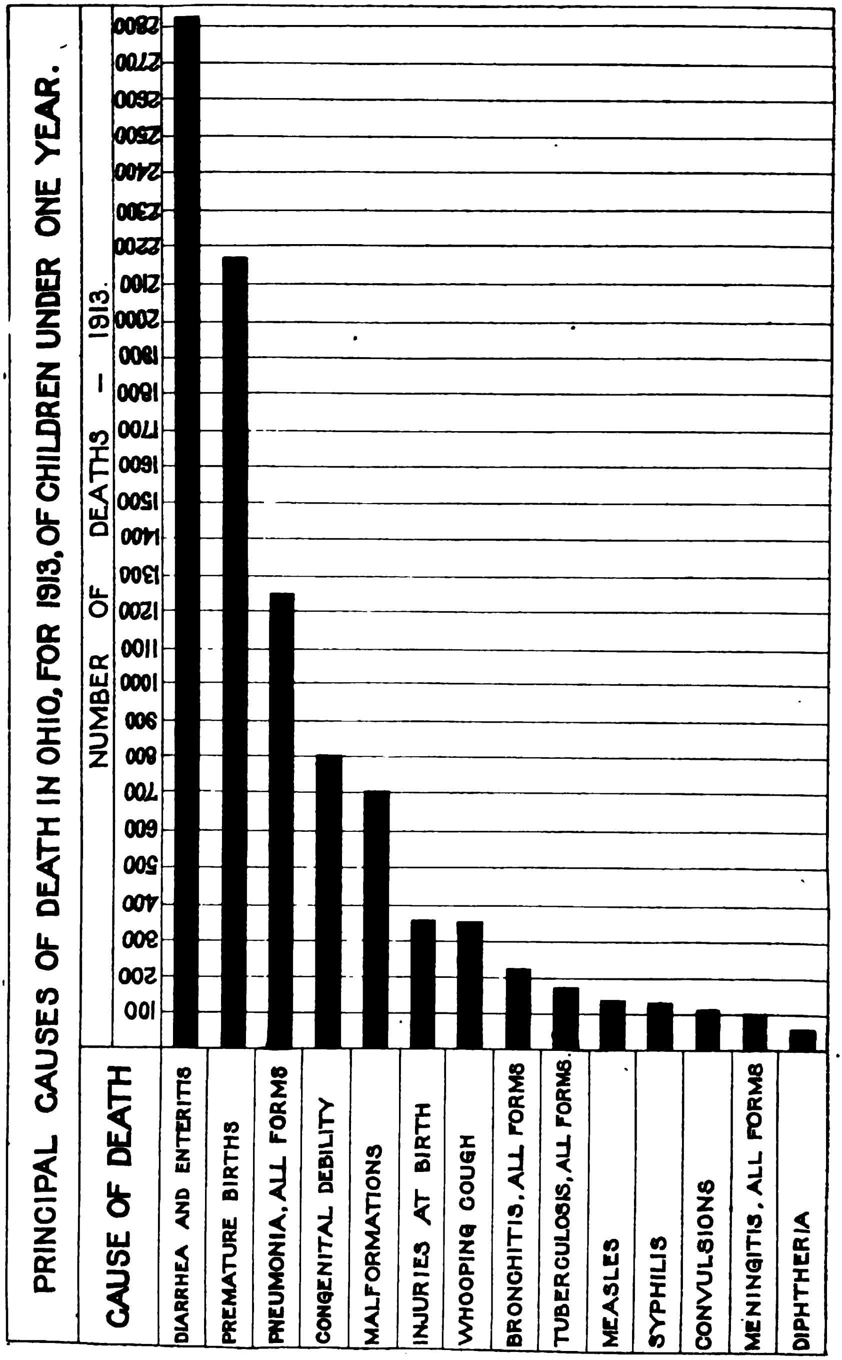
Next note, as shown graphically, the varying influence of the different diseases and abnormalities in the causation of infant mortality. Diarrhœa and enteritis rank first with a total of 2,828 deaths in 1913. Premature births accounted for 2,193 fatalities. Pneumonia, the "captain of the men of death", was fatal in 1,253 cases. Whooping cough was over six times, and measles nearly three times as fatal as diphtheria at this tender age. Tuberculosis caused 174 deaths and syphilis nearly as many.

Table 6 is a comparison of the deaths from diarrhœa and enteritis in urban and in rural districts, the term urban being restricted in this instance to include only cities with a population of 5,000 and over. The urban population, so defined, is larger by about two per cent than the rural population. The number of infant deaths for the whole period in cities was over twice the number in rural districts. In 1910, from some cause which we cannot explain, the number of infant deaths from diarrhœa and enteritis was greatly in excess of former and succeeding years, especially in the cities. In 1913 the number of infant deaths was again very high in both cities and rural districts.

TABLE 6.

NUMBER OF DEATHS FROM DIARRHOEA AND ENTERITIS UNDER TWO YEARS OF AGE FOR 1909-1913, INCLUSIVE, FOR CITIES AND FOR STATE EXCLUSIVE OF CITIES.

Year.	Number of Deaths from Diarrhea and Enteritis Under Two Years.		
	Cities.	State Exc. of Cities.	Total.
1909	1,954	1,076	3,030
1910	2,671	1,356	4,027
1911	1,881	877	2,758
1912	2,148	805	2,953
1913	2,430	1,119	3,549
1909-1913	11,084	5,233	16,317



PRINCIPAL CAUSES OF DEATH IN OHIO, FOR 1913, OF CHILDREN UNDER ONE YEAR.

Turning to the cities of Ohio, with which this paper is chiefly concerned, we find in Table 7 a record of the average rates for 1909-10-11 and the rates for 1912 and 1913 for diarrhœa and enteritis under two years of age for the fifteen largest cities. As a general rule, the larger the city the higher the infant death rate. The presence of a foreign population is usually instrumental in elevating the rate, particularly if such a population is composed of recent immigrants, among whom ignorance and poverty are rife. So it is no surprise to find Cleveland, Youngstown and Akron with high rates. The rate in Youngstown is excessive. What work is being done in that city to reduce the ravages of this plague? The rate in Lorain is extreme when the comparatively small population is considered. What campaign is being waged in Lorain to thwart death of his infant spoils? The Akron rate should not exceed one hundred. Is the infant welfare campaign in that city being carried out with the vigor and determination that should characterize a fight against a strong and persistent foe? Portsmouth, with a small population, has a rate nearly equal to that of Cleveland, by far the largest city in the state. Let us hear

TABLE 7.

AVERAGE RATES FOR 1909-10-11 AND RATES FOR 1912 AND 1913 FOR DIARRHOEA AND ENTERITIS UNDER TWO YEARS OF AGE FOR THE FIFTEEN LARGEST CITIES IN OHIO.

City.	Rates for Diarrhea and Enteritis Under Two Years.		
	1913.	1912.	1909-10-11.
Cleveland	130.6	137.0	140.50
Cincinnati	66.3	68.9	75.09
Columbus	40.6	30.9	46.79
Toledo	96.5	72.2	76.72
Dayton	77.3	63.1	67.31
Youngstown	194.1	202.1	184.65
Akron	144.3	121.4	82.06
Canton	60.1	62.3	75.07
Springfield	70.4	49.1	50.80
Hamilton	92.4	60.8	48.67
Lima	31.8	22.5	62.18
Lorain	163.3	195.2	200.47
Zanesville	57.7	44.8	52.01
Newark	54.0	29.6	36.47
Portsmouth	122.5	76.8	91.43

from the health officer of Portsmouth as to his infant saving campaign. Surely a discussion of these vital questions is the reason we have gathered together from all parts of the state. Let those who have already accomplished something to prevent the fearful ravages of infant mortality enlighten those who are still groping in darkness. In Table 8 are shown twenty-five cities whose rates exceeded 90.0 in 1913, seventeen of these cities having rates in excess of 100.0. Barberton and Niles lead the list and emphasize the need of baby saving campaigns in cities of this size. The rates in many of these cities are a disgrace to their citizens and to the commonwealth of

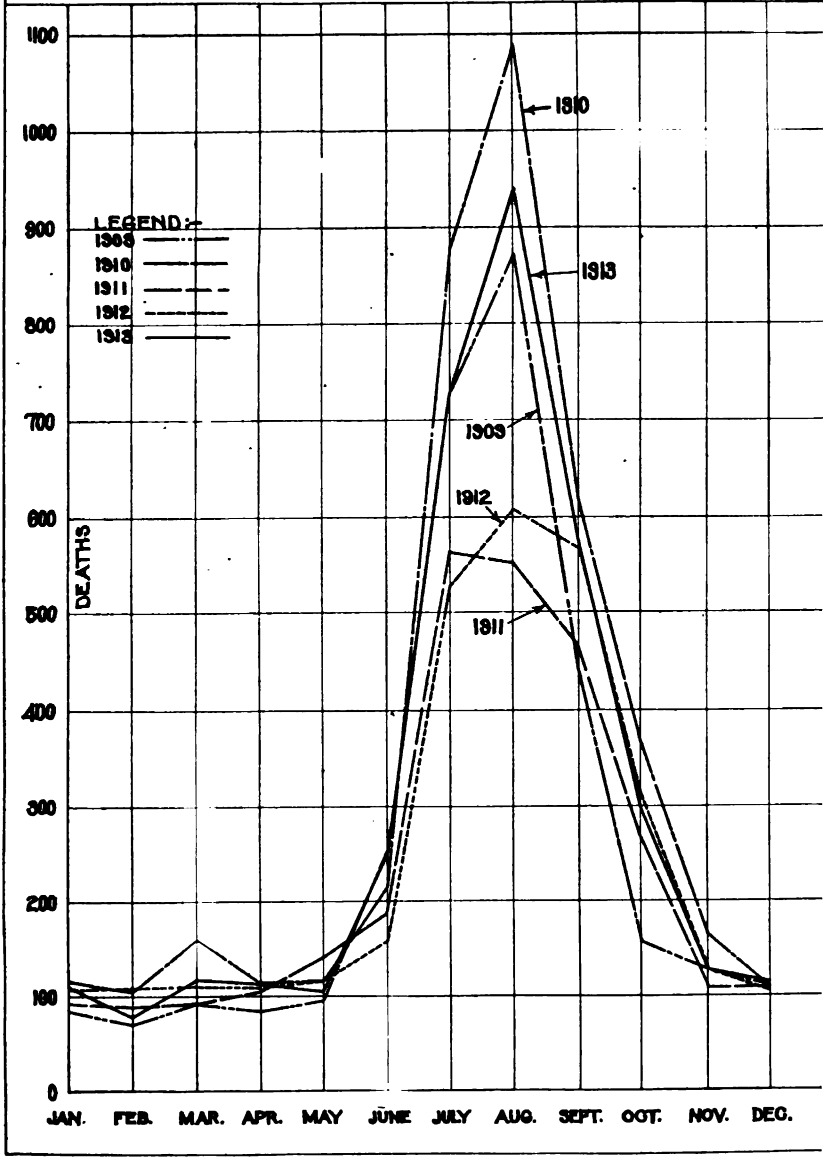
TABLE 8.

CITIES IN OHIO WITH RATES EXCEEDING 90.0 PER 100,000 POPULATION IN 1913, FOR DIARRHOEA AND ENTERITIS UNDER TWO YEARS OF AGE.

(Rates for 1912 and Average Rates for 1909-10-11 Shown.)

City.	Rates for Diarrhea and Enteritis Under Two Years.		
	1913.	1912.	1909–10–11.
Akron	144.3	121.4	82.06
Barberton	271.4	218.2	171.15
Bellaire	107.7	95.4	131.30
Bowling Green	132.8	....	44.35
Cambridge	97.3	16.6	43.91
Chillicothe	106.6	47.1	59.63
Circleville	118.6	44.5	51.90
Cleveland	130.6	137.0	140.50
Coshocton	94.2	38.8	44.88
East Liverpool	92.4	94.1	84.83
Elyria	95.3	43.3	83.26
Gallipolis	124.9	71.6	83.87
Hamilton	92.4	60.8	48.67
Lorain	163.3	195.2	200.47
Martins Ferry	114.8	63.6	98.2
Middletown	166.3	85.5	62.67
Niles	238.2	71.2	111.60
Portsmouth	122.5	76.8	91.43
Sidney	115.9	44.0	60.58
Steubenville	155.9	95.1	129.00
Toledo	96.5	72.2	76.72
Warren	92.4	68.7	48.94
Wellsville	108.5	73.8	72.37
Xenia	91.9	23.0	53.61
Youngstown	104.1	202.10	184.65

YEARLY CURVES SHOWING NUMBER OF DEATHS IN OHIO, 1909-13 INCLUSIVE, FROM DIARRHEA AND ENTERITIS FOR CHILDREN UNDER ONE YEAR OF AGE.



Ohio. I am not attempting to throw all the blame on health officials, although I doubt not that they deserve a fair share. Many doubtless are handicapped for lack of means. But the need for educational work along these lines is only the more manifest. If all the citizens of Ohio knew the truth I have no doubt that the infant death rate would be reduced or a different set of officers would preside over our health councils in city, village and township.

As diarrhœa and enteritis are perhaps the most important causes of infant deaths, these conditions require a closer study. The most remarkable phenomenon in this connection is the large increase in deaths from this cause during the summer months. This is well illustrated by the yearly curves. The average monthly number of deaths for the period November to June is approximately 100. The average number for each month during the period June to October, inclusive, is well over 500. The number of deaths during July, August and September exceeds the total for all other months. A consideration of these facts, which are also true of all other states and countries, has led to the promulgation of many theories, and to the establishment of two schools of opinion. One school claims that heat is the most important cause of the decided increase in infant deaths during the summer months. The other school claims that milk is responsible, and that heat affects the death rate only indirectly by causing the quality of milk to be lowered during the hot months. There is a third school of opinion in which both these factors are given just consideration, and both thought to be responsible for a proportion of the appalling mortality among infants. Extremely exhaustive studies have been made by advocates of both opinions. Those who believe that heat alone is the toxic influence argue as follows: There is little ground for the belief that the ordinary saprophytic germs of milk produce disease and death. No specific infant disease has been shown to be caused by these organisms. Milk epidemics as a rule attack all age groups, while diarrhœa and enteritis attack only infants. The use of sterilized milk should prevent the occurrence of deaths caused by milk bacteria, yet such has not always been the case. Children who receive only the purest cow's milk often contract typical summer diarrhœa and die as a result. The least increase in summer diarrhœa and the resulting infant mortality is found not among breast-fed babies but among those living in basements and cellars, — that is among cooler surroundings. It has further been shown that the temperature to which the infants who contribute most freely to the mortality tables are exposed is an indoor, and not an outdoor temperature, and that the indoor temperature of tenements and the houses in which this class live, is frequently much higher than the outdoor temperature. Those who adhere to the view that milk is the cause of diarrhœa and enteritis point to the fact that breast-fed children have a much lower death rate than bottle-fed babies; that the bacterial content and the consequent toxic changes in milk is greatly increased during the hot months of the year, coincident with the increase in infant mortality. They further point to experiments such as those of Park and Holt, who observed the effects of feeding six groups of infants on cheap store milk, condensed milk, milk from a central distributing station, good bottled milk, the best bottled milk, and breast milk respectively. Little difference was noted during the cool months of the year but in the summer the infants fed on breast milk and the best bottled milk showed the best results, while the worst results were obtained among those who used condensed milk and cheap store milk. With our present knowledge it is best to be on the safe side and to protect infants from a dirty or inferior milk supply by every means in our power. At the same time mothers and prospective mothers should be educated in the care of their children during hot weather.

Whatever the immediate causes of infant mortality, the fundamental causes are sociological and economic. Housing, labor conditions, illegitimacy, vice and its consequences, all are threads woven into the fabric of the scarlet curtain of infant mortality which hangs between 10,000 infants born into Ohio every year and a promising future as citizens of this state. Ignorance and neglect are the outcome of these conditions, and infant morbidity and mortality result. Of the more immediate causes, a grossly polluted water supply has been shown to be a factor. When this is a cause the mortality in the winter and spring may equal or exceed the usual increase in summer. Tuberculosis and syphilis have a well-marked relationship to infant mortality which has already been indicated in the tables. The mating of the unfit may have a considerable influence upon the infant death rate. Indeed, so many factors enter into this complex problem that almost any improvement in the sanitation of a city and the education of its citizens in public health will result in a lessening of infant mortality. It has been estimated that nearly half the infant deaths are due to preventable causes. In Ohio then, with a yearly average of over 10,000 infant deaths, there are measures, which if put into effect, would result in the saving of over 5,000 lives every year. These measures are well known and practicable. They require energy, co-operation, time, and money. If the work is arduous, the reward is correspondingly great. As I have previously pointed out the first need is for a more complete and perfect birth registration. Just as soon as we have a system of birth registration comparing in accuracy with death registration, public health authorities can calculate true infant mortality rates and can watch these rates, and immediately become cognizant of storm centers. England has taken advantage of this most important factor and has an Immediate Notification Act requiring reports of births within thirty-six hours of occurrence. It has been stated on no less authority than that of Arthur Newsholme, the eminent vital statistician, that the wonderful reduction in the infant mortality rate in England, within the last few years, has been due most particularly to this Immediate Notification Act. City health officials, especially, can realize the many advantages of a thirty-six hour notification act. Great energy should be devoted to perfecting birth registration under the present act effective in Ohio. The need of immediate notification is the more evident when we consider the enormous number of infant deaths attributed to prematurity and early infancy, and the alarming prevalence of ophthalmia neonatorum. Municipal baby-saving campaigns should begin with the parents, the strategic point. If proper information is furnished the public and particularly the prospective mother, diseases due to lack of antenatal care will be lessened. How can we reach the mother? To arrive at a solution of this problem the average city board of health must sacrifice its dignity to the exigencies of the situation. There must be close co-operation between the board of health and all bodies of citizens interested in the betterment of the race. The church, the school, women's clubs and all such organizations must be utilized. A good executive and organizer will bend the efforts of all these bodies in one direction, so that instead of having fifty weak campaigns there will be one united effort, the combined strength of which will be almost irresistible. When the baby is born the public health nurse must pay an immediate visit to the home, advise, assist and make a report for the future guidance of the department. If the family is too poor to provide for proper medical attention, free services must be offered. Milk depots should be established, and if properly conducted they will serve not only as places where safe milk may be secured at low or no cost, but as educational centers and as dispensaries for free and expert medical advice. The prevention of infantile diarrhœa must be aimed at by safe-guarding the milk supply and by educating mothers in the care of their children during the hot weather. Baby camps should be established, where the child of the tenement may find refuge from the grilling heat of the city pavements. The housing problem must not be considered solved until window screens have been provided, and a vigorous campaign should be waged against the house fly. The elimination of filth is a means of reducing infant deaths, as it is a well-established fact that there is a close relationship between filth and infant mortality. The public health or visiting nurse is perhaps the most important factor in the campaign. Every city represented here today should have at least one visiting nurse, and cities with a larger population than 10,000 should have more than one. Before entering on a campaign of this kind a survey of the field should be made and enough facts gathered to present to the city fathers and to cause them to loosen the public purse strings. Sometimes little sympathy should be accorded a health department which receives an insufficient appropriation. Every health department must show in an intelligible way the immensity of the problem and the fact that something can be done to reduce the number of lives wasted annually. In conclusion, I would call your attention to the fact that a newborn child has less chance of living a week than a man of ninety, and of living a year than a man of eighty. In the civilized world one infant dies every second, every hour of the twenty-four. Preventable infant deaths in Ohio almost equal the number of deaths from tuberculosis, and greatly exceed the combined number of deaths from typhoid fever, scarlet fever, measles, whooping cough and smallpox.

Surely, here is a problem which calls for our best efforts. All the energy and determination we possess are needed to remove this blot from our civilization and this stain from the otherwise fair record of our state.

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IMMUNITY AND SUSCEPTIBILITY.*

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(*Continued from page* 480.)

The Opsonins and Phagocytosis. It was shown a number of years ago that certain types of leucocytes and other body cells were capable of ingesting bacteria and other plant and animal cells. The mechanism of this process was not known until Wright and Douglas demonstrated certain substances in the blood serum and other body fluids which have the power of rendering the bacteria susceptible to phagocytosis. These substances are known as *opsonins* (Gr. I prepare food for). The phenomena of the phagocytosis depends almost wholly on these special opsonins. Leucocytes which have been washed free from all serum will not take up bacteria except in a few in rare instances. Bacteria which have been placed in contact with blood serum or other body fluids may be thoroughly washed, and then, when they are placed in contact with the leucocytes, they will be taken up. The opsonin reacts chemically with certain substances within the bacteria, and so to speak, sensitizes them. Opsonins are present in many normal serums for the various bacteria. They may be produced in animals not containing them by the process of immunization with various antigenous microörganisms. Opsonins are destroyed at about 60° C for thirty minutes, but there is some variation among them. When kept at 0° C opsonins will remain active for several days, but at a temperature of the body, 37° C, after the serum has been withdrawn, they rapidly deteriorate. Many opsonins have the structure of agglutinins and precipitins, although they bear some points of resemblance to antitoxins and complements. They possess two so-called chemical groups, a "combining group" by which they enter into chemical union with the bacteria and a "functional group" which really sensitizes the microörganism and makes it phagocytable.

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It has been shown that the opsonins may be increased in the serum of the animal or injected individual by the injection of heated (60° C.) cultures of the specific etiological microörganisms. Such substances are called *opsonogens* or *vaccines*. Vaccines are used to a great extent in the treatment of the various pus infections due to the staphylococci and also occasionally in tuberculosis and pneumonia. It is supposed that the opsonins are produced in the subcutaneous tissues and in the muscles.

The Opsonic Index. The concentration of the opsonins in an individual may be recorded in the following ways. Suppose the leucocytes of the infected individual take up a certain number of bacteria, say an average of 5, after counting 50 to 100 polymorphonuclear leucocytes. In this case the *phagocytic index* is said to be 5. Again, suppose the leucocytes of the normal individual take up 15 of the bacteria in question, the average after counting 50 to 100 leucocytes being always taken. The phagocytic index in this case would be 15. In order to determine the *opsonic index* of an infected individual the phagocytic index of the normal individual is taken as a denominator of a fraction and the phagocytic index of the infected individual as the numerator of the fraction. In the above illustration this would be 5/15, 1/3 or reduced to decimals 0.33+. The opsonic index, it can be seen, is somewhat of an indication of the resistance of the particular individual to the infecting microörganism in question. By the use of vaccines the opsonic index may be raised to at least 1.0 or even more, showing that the leucocytes are actively phagocytic and the opsonins increased in concentration in the blood serum. In such a case recovery would be indicated. When vaccines are injected in the treatment of infections the opsonic index has been shown to vary from time to time. Within a few hours after the injection the opsonic index falls below what it was at the time of the injection. This lowering of the index is known as the *"negative phase."* Following the fall in the index there is a continuous rise to a point equal to what it was in the beginning and above this point. This rise in the opsonic index is known as the *"positive phase."* The individual receiving the vaccine usually shows an increase in the symptoms during the *"negative phase."* Obviously, it is necessary not to give a subsequent injection of vaccine until the patient is at the height of the *"positive phase."* This can be best determined by determining the opsonic index.

Occasionally counts are made of the number of leucocytes which are actually taking up bacteria, disregarding the number of bacteria within the cells. The determination is always made on the basis of 100 and the per cent of leucocytes which are phagocytic is taken as the so-called *percentage index.* The percentage index also gives an idea of the resistance of the individual. It has been shown that in the practical work of treating infections with vaccines it is not absolutely necessary to determine the opsonic index or percentage index. The positive and negative phase may be determined fairly well by general clinical observations on the infected individual. Virulent bacteria are not readily phagocytized. For example, virulent streptococci and pneumococci are not phagocytized as easily as non-virulent forms. It seems in this instance that there is some toxic or poisonous substance produced by the bacteria which is antagonistic to the opsonins or perhaps an antiopsonin is formed.

The presence of opsonins in the body fluids of an animal is not absolute proof that such animal is highly resistant to infections. The resistance really depends on the activity of the phagocytes and in certain cases where the opsonins are high in concentration the phagocytes are not active. In other cases the reverse is true and in these cases opsonins and phagocytosis are of the utmost importance in the immunity of individuals. For example, in anthrax the immunity of the dog is due to opsonins and phagocytosis, while in the rat, although opsonins are present, there is no phagocytosis and immunity is due to antibacterial substances in the blood serum. In certain infections, such as typhoid fever, influenza, and uncomplicated milliary tuberculosis, there is a deficiency in leucocytes (leucopenia) and consequently even if the opsonins were concentrated and the bacteria sensitized there would be very little increase in the immunity from these causes.

Hemoöpsonins. It has been demonstrated that very frequently opsonins for red corpuscles are present in the sera and body fluids of animals. Such bodies sensitize the red blood corpuscles and render them susceptible to phagocytosis by the polymorphonuclear leucocytes and the epithelial and other body cells. They are designated as *hemopsonins.* Occasionally *iso- and auto-hemoöpsonins* are present in normal sera. For example, in human blood serum, it is probable that the process of red blood corpuscle destruction which take place in the spleen may be referred to the action of these types of opsonins and various phagocytic cells.

Agglutinins. Agglutinins are substances which are present in the blood sera and body fluids of normal and immune animals which have the power of producing a clumping and sedimentation of the microörganisms causing the specific infection or used in artificial immunization. The relationship of the agglutinins to the phenomena of immunity and the other antibodies which are produced during the process of infection and experimental inoculation is not known. One of the first agglutinins to be observed was that occurring in the blood serum in cases of typhoid fever and the agglutination reaction is now made use of in the diagnosis of this disease (*Widal test*). Agglutinins are specific substances and at high dilutions only cause a clumping of the microörganisms which give rise to their formation (antigens).

Normal Agglutinins. Agglutinating substances, as above stated, are frequently found in normal sera. In this case no direct connection between their formation and specific microörganisms can be established. Normal human serum frequently contains agglutinins for *B. typhosus, B coli, Bact. dysenteriae,* and occasionally *M. pyogenes var. aureus* and *Msp. comma* in certain rare cases. Agglutinins for *B. typhosus* which are present normally in the serum may give rise to confusion when this test is used for the diagnosis of typhoid fever. It is, therefore, necessary to dilute the serum of a suspected case of typhoid fever at least one to forty or one to fifty times in order to exclude the normal agglutinins and the so-called coagglutinins.

The Production of Agglutinins. Agglutinins may be produced artificially by the injection of bacteria, dead or alive, into the veins, subcutaneous tissues or peritoneal cavity. In rare cases they may be produced by feeding the bacteria, injecting them into the air passages of the lungs or by rubbing them into the skin. It is probable that the highest concentration of agglutinins results from the injection of dead bacteria. It is, however, necessary that these bacteria be not subjected to a temperature above 62° C. Many pathogenic and non-pathogenic bacteria form agglutinins when injected into the body. The concentration of the agglutinins produced varies greatly. Very high agglutinating sera are occasionally noted, such as, for example, one in one million when *B. typhosus* is used and one in two million when *Msp. comma* of Asiatic cholera is used. Often two strains of the same organism will vary greatly in their power to produce agglutinins. Again, the concentration of the agglutinins in an infected animal varies from day to day, and in order to make an accurate observation it is necessary to make repeated examinations on subsequent days. For example, in typhoid fever the agglutinins one day may be thirty times as strong as on a subsequent day.

The Distribution of Agglutinins in the Blood. As before stated these antibodies are found in practically all the body fluids. They reach their highest concentration in all probability in the blood serum. In certain cases they are in high concentration in the milk. Agglutinins are also present at times in the sputum, tears, and the humors of the eye.

Inherited Agglutinins. Agglutinating substances may be transferred from the mother to the offspring *in utero.* It has been frequently demonstrated, for example, that the offspring of mothers who have recently recovered from typhoid fever or who are infected at the time of the birth, have agglutinins in the body fluids. The same is true of the offspring of glandered horses. Notwithstanding the fact that the milk is frequently rich in agglutinins, these substances are not transferred to the offstpring to any great extent by this means.

The Substances Concerned in Agglutination. There are two distinct substances concerned in this reaction, one substance which is present in the serum or body fluids of the infected or immune individual, and other substances which are present in the microörganisms which are agglutinated. The substance in the serum, as before stated, is known as the *agglutinin,* the substance (antigen) in the bacteria or other microörganisms is known as the *agglutinogen.* When agglutinins and agglutinogens are combined together a new substance is ofrmed which is designated as an *agglutinate.* As to the location within the bacterial cell of this agglutinogen (agglutinum) there is some dispute. Various authorities have stated that it is present in the cell wall or on the cell wall. Others have held the view that it is located within the cell protoplasm and in certain instances in the flagellae. Without doubt, in certain cases this substance is excreted from the cell into the surrounding media, as is shown by the fact that when filtrates of bacterial cultures are injected they frequently give rise to the formation of agglutinins. This agglutinogenic substance is specific and varies with the species. There are, however, very colsely related substances of this character among some groups of bacteria. When these agglutinogenic substances are injected into the animal they frequently give rise to agglutinins which when combined with other members of this group will produce agglutination in low dilutions. Such a reaction and property is known as *"group agglutination,"* and the agglutinins produced in such a case are known as *coagglutinins.* For example, the serum of the patient suffering from typhoid fever or of an animal immunized with *B. typhosus* will produce an agglutination first of *B. typhosus,* but in addition, an agglutination of *B. coli, B. paracoli, B. paratyphosus,* and *B. enteriditis.* The agglutination of these last named organisms, of course, will not be active except in low dilutions, and in order to satisfactorily exclude them it is necessary to dilute the serum to a higher point. This phenomena of coagglutination is due to the fact that there are some chemical substances (agglutinogenic) within these bacteria which are common to all and which give rise to the formation of agglutinins, which are chemically similar to each other in certain respects.

Structure of Agglutinins and Agglutinogens. According to Ehrlich's conception the agglutinins are composed of two chemical groups, a haptophile or combining group with which it combines with the haptophore group of the agglutinogen and a zymophorous or agglutinophorous group which actually produces the agglutination. The agglutinogen is also composed of a combining group known as the haptophore group with which it combines with haptophile of the agglutinin. It is probable that this same haptophore group will combine also with various tissue cells and give rise to formations of agglutinins which are really free haptophile receptors of the tissue cells which have been acted upon by the agglutinogenic substance contained in the bacteria.

Agglutinoids. It is possible by means of heat and chemicals to destroy the zymophorous group of the agglutinin leaving only the haptophile group. Such a substance is known as an *agglutinoid,* being similar to a toxoid. A temperature of not to exceed 60° to 70° C. is necessary to produce this substance. Agglutinoids will combine with the agglutinogen of the bacteria but they will not produce a clumping or an agglutinate. Occasionally in some fresh sera substances are found which have a greater affinity for the agglutinogen of the bacteria than the agglutinins have. Such substances are designated as *proagglutinoids* and are in this respect similar to protoxoids.

The Stages of Agglutination. There are two distinct stages of the agglutination reaction. Neither of these stages can take place unless some salts or electrolytes are present. Sodium chloride is the common salt present. The first phase of the agglutination reaction is a union between the agglutinin and the agglutinogen of the bacteria. The second phase is the actual clumping of the bacteria. It is supposed that in this last phase the zymogenic group of the agglutinin is acting. In the first phase the haptophile group of the agglutinin is combined with the haptophore group of the agglutinogen.

There are some bacteria which cannot be agglutinated, as for example, *Bact. pneumoniae* of Friedlander, and in rare instances *B. typhosus* cannot be agglutinated. It is possible, for example, to grow *B. typhosus* at a temperature of 42° C. and cause it to lose its power of producing agglutinins. Bacteria may also be modified chemically so that they will lose the power to produce agglutinins.

Agglutinins bear no relationship to bactericidal substances, antitoxins, opsonins or any of the other antibodies. They are both of use in the determination of species of bacteria when a known agglutinating serum is used, and they are also of use in determining the cause of infections where a known culture or agglutinogenic substance is used. The agglutination reaction is used in the diagnosis of typhoid fever, paratyphoid fever, glanders and dysentery.

Hemoagglutinins. Agglutinating substances are sometimes produced for red blood corpuscles when these cells are used in the immunization of an animal. Such agglutinins when combined with the corpuscles produce a clumping which is known as hemoagglutination. The mechanism of the reaction is the same as that of bacterial agglutinins. It is possible that hemoagglutination is one important factor in the production of agglutination thrombi in certain infectious diseases such as typhoid fever.

Precipitins. Another group of substances, which are antibodies, are produced through the processes of immunization which have not been definitely connected with the phenomena of immunity. These substances are known as the *precipitins.* Precipitins may be produced for the protein substances of most bacterial cells and a large variety of other plant and animal cells, such as blood serum, milk and grains. They were first demonstrated in 1897 by Kraus, who noted that the bouillon filtrates of cultures of *B. typhosus, Bact. pestis.* and *Msp. comma* would cause precipitates when mixed with the blood serum taken from cases of these diseases. The precipitin reaction is definite and specific. The protein substance used in immunization or concerned in the infection is the only one which is precipitated when the antiserum is added. To the protein substance which produces the precipitins the name *precipitinogen* is applied. To that substance in the blood serum and body fluids of the immunized or infected animal or person the name *precipitin* is applied. The combination between the precipitinogen and the precipitin forms a new chemical substance known as a *precipitate*. Precipitin may be formed in various parts of the body, for example, in the parenchymatous cells of the organs and by the leucocytes. *Bact. diphtheriae* will not act as a precipitinogen and will not produce precipitins. This is practically the only bacterium which will not yield these antibodies.

Normal Precipitins. Precipitins for alien blood sera have been found in the organs and glood of seemingly normal animals. Normal precipitins for bacterial proteins have not been demonstrated to a certainty.

Mechanism of the Formation of Precipitins. The mechanism of the formation of precipitins is similar to that of other antibodies. When the precipitinogen is injected into the body of an animal, it combines with certain of the body cells, occupying chemical receptors which otherwise would be used for the taking up of food products. As a result the cells produce new receptors and the number of these more than compensate for the ones already utilized. The chemical receptors are finally thrown off into the body fluids and form the precipitins. It is supposed that the precipitinogen contains haptophore receptors which combine with the haptophile receptors of the cells. When these haptophile receptors are regenerated and producd in excess, as before stated, they are thrown off into the body fluids and are really what we know as precipitins. Precipitins are produced most commonly for widely different or heterologous substances or sera. (heteroprecipitins).

Autoprecipitins and Isoprecipitins. It has been demonstrated that animals will not produce precipitins for their own protein substances. For example, if an animal is bled and injected with its own blood serum an antibody will not be produced. Therefore, *autoprecipitins* do not occur. Again it has been shown that only in rare instances do animals produce precipitins for members of the same species. For example, if an animal, such as a goat, is bled and the blood serum injected into another goat, it is only in rare cases that the second goat will produce an antibody which is capable of producing precipitation of the proteins in the first goat's blood serum. Such precipitins are known as *isoprecipitins* and occur only in a very small per cent of cases and with no regularity.

The Phenomena of Specific Inhibition. When precipitins are heated to low temperature (50° to 60° C.) or are subjected to the action of light or certain chemicals, their power to produce a precipitate when combined with a precipitinogen is destroyed. The precipitin which has been heated becomes a *precipitoid* similar to an agglutinoid or a toxoid. Their ability to combine with the precipitinogen still remains. It is possible, therefore, for precipitinogen still remains. It is possible, therefore, for precipitoids to combine with all the available precipitinogen so that when fresh precipitin is added no precipitate will occur. This is known as *specific inhibition* and some times leads to very confusing findings in the study of these immune bodies.

Antiprecipitins. When an animal has produced a precipitin in its blood serum due to the injection of the antigenous substance which in this instance is known as the precipitinogen, this precipitin, which is a definite antibody, may be used for the immunization of another animal and an *antiprecipitin* produced; that is, a body which will combine with the precipitin in such a way as to prevent precipitation when this substance is combined with the precipitinogen. This is then, in fact, an *antiantibody* and is practically the only example we have in immune reactions of such a substance. The antiantibody is the limit for antibody formation.

The Precipitinogen. As before stated, the precipitinogen is any protein substance which will cause the formation of precipitins. Certain of the precipitinogens are composed of two groups, one which is thermostable and another which is thermolabile. Therefore, when these precipitinogens are heated and this thermolabile substances destroyed there results a substance which is exactly similar to the precipitoid produced by heating the precipitin. Such bodies are known as the *precipitoids of the precipitinogen* in distinction from the *precipitoids of the precipitin.* These precipitoids retain their power to combine with precipitin, but no precipitate results on such combination.

The Precipitate. When precipitin and precipitinogen combine it requires some little tome before precipitation occurs. This is dependent upon the temperature (37° C best) and certain other factors. The presence of the trace of organic acids materially facilitates this reaction. Furthermore, the reaction will not take place without the presence of certain electrolytes or salts.

Coprecipitins. The phenomena of "group precipitation" does not occur as often as does "group agglutination." The bacterial precipitins are very markedly specific but some of the blood precipitins are not so specific. For example, in a case where two rabbits have been immunized, one with the blood serum of men and the other with the blood serum of the monkey, it is found that the serum of the rabbit immunized to human blood serum will precipitate monkey blood serum to a less degree, of course, than human serum. This is due to the fact that there are certain chemical substances in common in the blood sera of the money and man. There are other rare instances of coprecipitins which will not be discussed.

The Forensic Use of Precipitins. The precipitins are of use on account of their great specificity in the identification of various albuminous substances. They have been used, for example, in the identification of bloods. Before the knowledge of the precipitins was available, the only means of determining one blood from another was by means of the microscopic examination of the corpuscles. If the corpuscles were in a good condition, it was possible, for example, to differentiate between a mammalian and fowl blood, on account of the nucleation of the corpuscles of the latter. By the use of the spectroscope it was also possible to determine whether a particular stain was blood or not. When it came to determiing the exact species from which the blood came it was impossible. By means of the precipitins this can be done. For example, taken a stain which is supposed to be blood, this is carefully dissolved out in 0.85 per cent sodium chloride solution and placed in a sterile test tube. A series of animals such as rabbits have been immunized to the various known blood sera and after immunization their sera are drawn off. These sera contain the precipitins for the various sera and corpuscles used in immunization. These precipitins are combined separately in small test tubes with the salt solution preparation of the blood in question. A precipitate occurs when the corresponding precipitating serum is added. It is necessary, of course, to place these preparations in the incubator at 37° C. By this method all types of mammalian blood may be separated from each other with the possible exception, as before stated, of monkey and human blood. In this instance it is necessary to make careful comparisons in order to determine the concentration of the precipitins. The precipitins may also be used in the identification of various meats and other albuminous substances such as eggs.

In some ways the precipitins resemble colloids and it has been shown that organic colloidal substances such as ferric hydroxide, etc., when in aqueous solution, may be precipitated by the addition of certain electrolytic salts. The precipitation occurs in this instance in a very similar manner to that of the organic precipitins.

THE THEORIES OF IMMUNITY.

Various theories have been proposed which attempt to account for the resistance naturally present in animals, and the resistance which may be artificially produced. One of the first theories proposed was the so-called *noxious retention theory* which held the view that in natural immunity there were natural noxious substances present in the body which prevented the growth of the infectious microörganisms. In acquired immunity it was supposed that, as the result of an infection, specific noxious substances were produced and consequently new infecting microörganisms of the same species as those producing the original infections were unable to grow. This theory has long been discarded. Another theory, for a time prominent, was known as the *exhaustion theory*. It was conceived that natural immunity was due to the fact that the body tissues did not possess the necessary food products for the invading microörganisms and that in acquired immunity these necessary food products were exhausted completely so that when a second infection was attempted none could possibly occur. This theory has also been discarded.

One of the most prominent theories is the one which has been held recently, with some modifications, namely, the *chemical side-chain theory of Ehrlich*. It is claimed that tissue cells are made up of definite chemical substances which possess chemical side chains which are open for chemical combination with other substances. It is by means of these chemical side chains that food products are absorbed and assimilated by the cells. Furthermore, it is by means of these chemical side chains that toxins and various poisons are absorbed by the cells. It seems to have been clearly demonstrated that as a result of the absorption by certain cells of the body of toxic substances, particularly bacterial toxins, that the cells are stimulated and produce or open up an excess of these chemical side chains for combination with various substances. It is conceived that if enough toxin, (not enough to kill the cells), is assimilated by the cells the chemical side chains which are definite chemical substances will be split off from the original cell compound and escape into circulation. It is these escaped chemical side chains which constitute the antitoxin or bactercidal substances. In the case of antitoxins, they possess a maximum affinity for the toxin and will combine with the toxin much more readily than the toxin will combine with the remaining chemical side chains of the original cell compound. In the case of bactericidal substances they will combine with the bacteria and destroy them and liberate in this way the endotoxins which may subsequently combine with antiendotoxin (?) or tissue cells. Inasmuch as no antiendotoxins are ever produced, the presence of bactericidal substances in a large per cent of instances is a detrimental factor. The production of antiendotoxins by some method or other is extremely desirable. Since the majority of our diseases are due to bacteria producing endotoxins, such a product would be of immense value in combating these infections. The chemical theory of Ehrlich explains many features of the phenomena of immunity. This theory has been the basis of nearly all of the preceeding discussion on the various antibodies.

Metschnikof suggested what may be called a *phagocytic theory* of immunity. According to his ideas and those belonging to his school, the phagocytes, and principally the mononuclear and polymorphonuclear leucocytes, are concerned in immunity. He explains natural immunity to toxins on the basis of an increased toxin absorptive power on the part of these cells for toxins. He explains natural antibacterial immunity to an increased power of phagocytosis for the invading microörganism by the leucocytes. He conceived that in acquired immunity to toxins these cells develop as the result of an infection or artificial injection of microörganisms, an increased power of absorption of toxin, and the power of producing antitoxins is due to the increased power of the phagocytes to ingest and digest invading microörganisms.

We find the best explanation for the phenomena of immunity in both the theories of Ehrlich and Metschnikof. Undoubtedly certain forms or types of immunity are due to definite chemical substances known as antitoxins or bactericidal substances while other types are due to the activity of the phagocytes.

A SURVEY OF INDUSTRIAL HEALTH-HAZARDS AND OCCUPATIONAL DISEASES IN OHIO.

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(*Continued from the April issue.*)

PART IV.

THE INVESTIGATION OF INDUSTRIES IN OHIO.

The plan has been to make a hygienic survey of the principal manufacturing industries of the state. An idea of their type, extent and number of persons concerned can be obtained from the U. S. Census of Manufactures. Such a classification, however, is not well adapted to a hygienic survey, since a great mass of wage-earners may be employed in comparatively non-hazardous callings. Hence it is more proper to speak of health-hazardous processes than health-hazardous industries.

For our purposes, industries have been divided into six classes as follows:

(1) Those using poisons as a chief hazard.
(2) Dusty industries.
(3) Those in which fatigue and inactivity are the chief hazards.
(4) Those in which heat, cold, moisture, or dampness predominate.
(5) Those in which there is a more than usual liability to contracting communicable diseases.
(6) Industries having miscellaneous hazards not included above.

About half of the wage-earners of the state in manufacturing pursuits have been included in the industries investigated. In some instances strikes and business depressions interfered with the survey in certain lines of industry, but, outside of coal mining, not to any extent. The survey has not included non-manufacturing pursuits, such as general construction work, mercantile and trade pursuits, transportation, agricultural, animal, forestry and personal service pursuits, and those callings which engage professional, semi-professional and clerical persons. There are a number of manufacturing industries and processes, of course, which the survey was unable to get to because of limitations in time and funds, but those described constitute the principal ones and represent the vast majority of wage-earners. In this Part, then, are described, in a general way, the industries investigated, and the extent to which they have been surveyed, as well as the types of health-hazardous processes found to exist in them. The description of these processes will be taken up in the next Part. It will be seen that irrespective of the number of industries and the number of trades, health-hazardous processes are comparatively few in number. From a hygienic part of view, many trades and callings are so similar that they can be grouped together under one common head. Any peculiarities, due to certain trades or operations, are described when they occur.

A large class of wage-earners are simply doing factory work. Such have been classified under the head of "factory processes" in the next Part. Except for dexterity, which experience develops, all such work is unskilled labor. This is the most convenient heading under which to describe the hazards of many processes which involve routine machine operations and hand work, such as assembling, inspecting and finishing of products. Every survey has a limit to the fine subdivisions into which it may go. It was the intent originally to make investigations which would cover 1/10th of the wage-earners in each particular industry, guided, of course, by the relative hazards of such industries. Later, this was reduced to 1/5th of the total wage-earners, as given in the U. S. Census of Manufactures for the State of Ohio (1910). It will be seen, however, that in many instances the survey has considerably passed this mark, even to the extent of reporting upon more places and more workers than the census figures give for the totals. In all cases our figures are limited strictly to the wage-earners, and do not concern office and managerial forces.

To make the survey representative and fair, the aim has been to investigate large, medium sized and small plants in all industries reported upon, and to carry the investigation of each industry into small cities, and even villages, in different parts of the state, as well as to include the large cities.

To anyone who has perused the previous sections of this report (Parts I, II, and III), it will be seen that any establishment employing workers at regular applications is certain to have some health-hazardous situations, even though naught but general factory processes are engaged in. The question with the survey has been the methods used, if any, to circumvent all such hazards to health. The prime object of the survey has been to lay bare the industrial conditions which are inducing or promoting the preventable and degenerative diseases pointed out in the tables given in Part II and Part VI.

Almost invariably our representatives, after presenting their credentials at the various establishments have been most courteously received. It is only fair to state that managements not only tolerated our investigations, but in 95% of instances, at least, did everything in their power to enable us to get at the facts, often at considerable inconvenience to themselves and the loss of valuable time. Our investigators always came unannounced. Itineraries were so arranged that none knew where nor when these inspections would be made. Hence conditions were seen as they really were, in, we believe, all instances. It is necessary to say that in many places certain hygienic improvements were under contemplation, or under way at the time of investigations, so that any subsequent survey would probably find them better. Unquestionably, in many instances our own investigations, without necessarily intending to do so, initiated hygienic improvements.

The investigators, unless upon special missions, inspected all plants from basement to loft, where wage-earners were employed, inquired freely into the nature of processes, and endeavored to get at all facts which had any bearing upon the health of the wage-earners, both good and bad. For each plant a summarized report was made, covering the following features: character of business, total employes, total wage-earners (males; females; youths, 16 to 20; and minors under 16), trade processes, mechanical health appliances, health instructions and placards, benefit organizations covering sicknesses, pensions and death, general sanitation features covering toilets, washing facilities, shower baths, time allowance for washing, change rooms, lockers, clothing and by whom supplied, rest rooms for females, luncheon quarters, seasonal influences, welfare work outside of the factory, and the general appearance and contentment of the workers. (For the hygienic features of special processes see Part V.)

In connection with some of the industries, here described, are various vital statistics which have been available. Only such have been used whose source is authentic, and then only such figures as are large enough to mean something. One fault which oftentimes employers, as well as others, fall into is that of quoting a few instances, and attempting to draw general conclusions therefrom. For instance, it may be shown that in a given process ¼ of the workers have remained so engaged for years without apparent health effect. The fallacy lies in not being able to state what has happened to the other ¾ of the wage-earners who have been employed. Instances are known where, of 10 persons employed, 2 have remained steadily, while in the course of a year's time, 50 different individuals worked in the remaining 8 places, nearly all leaving because of health complaints.

An especial appeal is made to employers to keep sick records. We are glad to say that this is now done by some of the most progressive establishments. Such records should include, not only absences due to sickness, but all health complaints reported to foreman or others, not only concerning the work, but of any or every nature. Employers are not hygienists nor physicians as a rule, and if they attempt to judge upon the relationship between these complaints and work they make mistakes. It is only natural, also, that certain features bearing upon the conservation of public health should escape the notice of the layman, or appear too trivial to warrant attention. Right here is where an establishment would be immensely benefitted through the services of a good physician. The physician could, at intervals, go over the records of absences, sicknesses, and health complaints, and suggest many remedies. In all processes involving the handling of poisons, and in trades in which the known death rate from preventable diseases is high, especial attention should be given, such as a physical examination at the time of employment, and a health inquiry at intervals thereafter. In poisonous industries, for instance, a five minute health inquiry, by a physician, of each worker about once a month would be all that is usually necessary. Furthermore, the physician is a very good person through whom to get to the employes. His services, although only occasionally employed, would be of immense help to the employer, not only in the supervision of the health of his employes, but in instilling the principles of personal hygiene among them, and in overcoming indifferences to efforts which employers and others may make in this direction. There is no sadder picture than the employer whose welfare efforts have been unappreciated, misunderstood, and, perhaps, scoffed at by his employes, until he has dropped his well-meaning intentions, locked up his shower baths, speeded up his machinery, and, perhaps, lengthened the workday. The reason for this is that along with every improvement must go education. Education in industrial hygiene is a part of the responsibility of the employer. There is no better man to help him out in this situation than the occasional services of a physician who is well respected in the community.

DEFINITIONS.

Industry. — Any single branch of productive activity; as, the iron industry, the soap industry, etc.

Establishment.—A place of business with its buildings, grounds, equipments and personnel.

Plant.—Same as "establishment".

Place.—In Parts IV. and V. this word is used very often and is a shorter term for the word "establishment".

Department.—Branch of an establishment, especially when such is located in quarters by itself; as, painting and varnishing department, foundry department, etc.

Process.—Particular trade, calling or manipulation; as, painting process, pickling process, etc.

An *industry* is represented by many *establishments* (plants or places), each of which has several *departments,* while in each department there may be one or several *trade processes,* each engaging a number of *wage-earners.* Wage-earners engaged in similar trade processes usually are subjected to similar *health-hazards,* while if there are several trade processes in the same department, wage-earners may be subjected to the health-hazards of other processes than their own.

A RUBBER COMPANY'S REPORT.

The following tables (abbreviated) show what one rubber company, employing some 650 workers, accomplished in the winter of 1913-14 in the matter of Illness Records, Physical Examinations and Sickness Records of their employes:

"We find that there was a total of about 380 examinations at the regular examination and since that time the total has risen to 443. Now out of these 443, the items show as follows:

I. *Last illness* ran the whole list almost, malaria predominating with 6, measles 5, penumonia 4, rheumatism, pneumonia, sore throat, stomach trouble, typhoid, scarlet fever. — Only 45 cases, all told, of close enough dates to report, that is within the last four years.

II. *Physical Examination Finding:*

Eyes: Vision, right 5, left 5.
Hearing: Right 2, left 2.
Chest and contained organs:
  A total of 19 cases:
    Heart Diseases, 12.
    Arterial Sclerosis, 6.
    Pleurisy, 1.
Abdomen and contained organs — 44 cases:
  All pertaining to hernia.
Rectum and Genito-urinary organs — 28 cases:
  Varicocele, 27.
  Hydrocele, 1.
Mental Alertness, poor — 6 cases:
Illiterate — 10 cases:

"In the case of the hernial cases above mentioned, with the exception of probably a dozen, they were very slight and these were or are now all properly supported by truss so that they cause no inconvenience. There were probably a half dozen cases of varicocele, and the hydrocele was bad. These cases were all instructed to wear proper support to prevent aggravation of the trouble.

III. Following is a list *showing Hospital information for months designated,* there being no major illness cases, and with but one or two exceptions, all parties returned to work immediately:

November (1st month of Hospital)

Illness cases 93 — Male 61, Female 32.

These cases included migraine, toothache, throat affection, in the most part, with a number of other trivial diseases.

Surgical cases 177 — Male 156, Female 21.

Mostly contusions, abrasions, infections from scratches, and sprains, nothing serious, excepting one contused heel and one elbow abrasion and puncture, both cases reported to State.

December.

Illness cases 57 — Male 26, Female 31.
Practically same as November.
Surgical cases 61 — Male 51, Female 10.

Same as for November, excepting one crushed hand, one hand and leg injured, one side bruised, all reported to State Commission, the crushed hand having to be amputated.

January, 1914.

Illness cases 77 — Male 38, Female 39.
Same as former months.
Surgical cases 72 — Male 64, Female 8.
Usual, two cases reported to State, neither being serious.

February.

Illness 118 — Male 67, Female 51.
Surgical 42 — Male 39, Female 3.
Two cases reported to State, neither being a major accident."

There is no question but that from the manner in which the *superintendent of this firm* has taken hold of the question of *physical examinations* and *medical records* of his employes, he is getting together a working force which is superb, one in which the defective worker is properly fitted to his job (not discharged), and one in which the constant repetition of minor health complaints are having their causes discovered and (whether occupational or not) these causes eliminated when preventable.

A prominent eastern establishment has been able to improve cases of heart disease by selecting proper work for such persons, not only saving lives thereby, but keeping worthy and productive men on their jobs.

A large steel company, which employed an average of 5,602 workers during a period of 38 months, supplied us with very carefully compiled tables of sickness taken from its sick benefit association records, which covered all employes. (No accidents, or venereal diseases included.) In all cases workers were genuinely sick for at least one week. Classifications showed as follows:

I. General Character of Sickness in an Iron and Steel Establishment.

Sickness.	*No. Claims.*	*Yearly Percentage.*
Preventable diseases	1,150	5.750
Degenerative diseases	227	1.135
Other diseases	67	.335
Total	1,444	7.220

II. Systemic Classification of Sickness in an Iron and Steel Establishment.

Systematic Diseases.	*No. Claims.*	*Yearly Percentage.*
Respiratory[1]	391	1.955
Digestive[2]	285	1.425
Communicable[3]	218	1.090
Musculo-osseous[4]	184	.920
Nervous[5]	79	.395
Skin[6]	65	.325
Circulatory[7]	63	.315
Urinary[8]	45	.225
Strain, etc.[9]	41	.205
Constitutional[10]	27	.135
Special Senses (ears, 15)	17	.085
Chronic Infections	18	.090
Lymphadenoid	6	.030
Neoplasms	5	.025
Total	1,444	7.220

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[1] Bronchitis, 145; Pneumonia, 75; Tuberculosis, 51; Pleurisy, 39; Tonsillitis, 34; Miscellaneous, 47.

[2] Gastritis, 102; Appendicitis, 53; Liver Trouble, 34; Enteritis, 30; Indigestion, 19; Miscellaneous, 41.

[3] La Grippe, 100; Typhoid Fever, 72; Mumps, 10; Measles, 9; Misc., 27.

[4] Rheumatism, 141; Lumbago, 37; Miscellaneous, 6.

[5] Sciatica, 18; Neuralgia, 13; Neurasthenia, 12; Neuritis, 9; Paralysis, 8; Miscellaneous, 19.

[6] Boils and Carbuncles, 40; Conjunctivitis, 9; Miscellaneous, 16.

[7] Heart Trouble, 31; Varicose Veins, 13; Apoplexy and Cerebral Hemorrhage, 8; Miscellaneous, 11.

[8] Kidney Trouble and Nephritis, 39; Cystitis, 6.

[9] Hemorrhoids, 16; Hernia, 13; Heat Prostration, 4; Miscellaneous, 7.

[10] Auto-intoxication, 24; Diabetes, 3.

III. The Average (Yearly) Morbidity Figures in the Various Departments of an Iron and Steel Establishment During a Period of 3 Years, 1911 to 1913 Inclusive.

(The greatest variation of numbers employed did not exceed 15% in any one department.)

Departments.	*Average Number of Employes.*	*Average Number Sick.*	*Average Per cent Sick.*
(a) *Heat Exposed.*			
Bessemer	393.3	33.	8.39
Open Hearth	145.3	7.	4.81
Rail and Shape Mill	500.	43.3	8.66
Blast Furnaces	261.	35.	13.41
Foundry	163.3	12.7	7.77
Shelf Mills	348.3	33.3	9.56
Pipe Mill	1,764.7	162.	9.18
(b) *Weather Exposed.*			
Police	35.	2.7	7.62
Railroad (yards)	156.3	9.	5.76
Section Hands	110.	10.	9.09
Yard Labor	468.	28.7	6.13
Ore Docks	90.3	8.3	9.19
Bricklayers	72.7	2.7	3.66
Building Construction	106.8	9.7	9.07
(c) *Indoors* (mostly).			
Mechanical	472.3	47.7	10.09
Electrical	181.3	4.3	2.37
Miscellaneous	351.6	11.3	3.21
Total	5,619.7	460.7	8.20

The above tables are very important—

First, because they show the type and the minimum amount of sickness that can be expected at the present day in an iron and steel establishment which has the highest attainments in sanitation and hygiene of working quarters, and medical supervision of its employes.

Second, because the last table (No. III.) shows definitely which departments have the most and which have the least percentage of cases of sickness, and hence where the greatest precautions are necessary.

Third, because average sickness figures are shown for a number of "weather exposed" groups of workers who are under organized welfare and medical supervision—figures hard to obtain for these classes. It may be added in conclusion that a large percentage of these workers are foreigners, Eastern European, and therefore the most difficult class to instruct and supervise, but a strong overseers' and foremen's organization with high ideals, patience and persistence has developed a working force in a health-hazardous line of industry in which the average yearly sickness is only 8.2 per cent. (The statistics supplied give the exact types of sickness in each department. but the necessarily small numbers for each disease do not make it advisable to publish the same here. Suffice it to say that respiratory and digestive diseases lead in practically all departments.)

(To be continued.)

GENERAL PROCESSES.

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(Continued from the April issue.)

PICKLING.

"Pickling" is a process to remove the "scale" to which sheet iron, black plate, etc., is subjected in preparation for galvanizing or tinning. It is practically always done with the aid of machinery, which dips the sheets up and down in the pickling solutions, the sheets standing on edge in the racks of a cradle. It is the duty of the workers to place the sheets in the cradle, move or revolve the cradle from one vat to the other, and to take the sheets out when finished. In the case of pipes and other articles the mechanical process, of course, differs somewhat. The solutions used are usually a double acid bath, "black pickle" and "white pickle," in which sulphuric acid, in comparatively weak solution in hot water is used, or hydrochloric acid may be used in cold water. Thereafter the pickled material is rinsed in running water, or in alkali water and then plain water.

The process was investigated in 16 establishments, in 12 cities, and in the following industries: Iron and Steel Mills; Tinning; Galvanizing; Automobiles; Wire; Foundry and Machine Shop Products; Signs and Advertising Novelties. There were a total of 180 wage-earners employed, all males. In but 1 small place was the process done by hand. As a rule, but a comparatively few men were required to perform this work, even in large establishments. In the places investigated, the attitude toward employes seemed very good in 10 places, fair in 5 more, and bad in 1. The type of workers was good in 6 places, fair in 4, and largely ignorant foreigners in the remaining 6. The men appeared to remain fairly well at the work in 14 of the 16 places. In 3 places health appliances, consisting of hoods covering the pickling vats, were good; in 2 places they seemed fairly efficient, in 1 place, bad, while in the remaining 10 they were entirely absent. Some instructions were given concerning employes' health in 1 place, and in 4 places sick benefit associations existed. The work quarters were hygienically well constructed in 7 places, fairly so in 4 more, and not so in the remaining 5. Other processes were present in 6 places, usually Galvanizing, but in large mills various kinds of work were done in the same premises. Age-group estimations summed up as follows: over 50 years, 3; between 40 and 50 years, 14; and between 20 and 40 years, 163.

Dampness was a considerable hazard in 5 places, and to some extent in 8 more, due to the splashing of floors from the process and the absence of good drainage. In 4 places *light* was very poor and in 2 others it should have been much better. The *ventilation* of quarters was not good in half of the places. In 4 places exposure to *heat* was a hazard, and particularly so in 1. There was also some risk from *cold* drafts, combined with working in a humid and steamy atmosphere. For the type of men employed the work itself was not *fatiguing,* although considerable lifting, constant standing, monotony, and hurrying piece-work, combined with evidences of "speeding up," were present. In addition, hours were uncommonly long in some places. The workday was found to be under 9 hours in 2 places, 9 to 10 hours in 7 places, and from 11 to 12 hours in the remaining 7. The noon recess was 1 hour in 5 places, ¾ hour in 2 places, ½ hour in 8 places, and "as desired" in 1. Night shifts were the rule in some of the places. There was some risk of contracting *communicable diseases* in all except, possibly, one place, due to the use of common drinking cups, absence or inadequacy of washing facilities, crude sanitary conveniences, frequent injuries and cuts, short-intervaled handling of materials by different workers, etc. While few precautions were observed as to spitting, the floors were usually wet, and dust was not a feature. The liability to *poisoning* lay in the effects of acid fumes and in one or two instances, alkali vapors, as well as hot cyanid solutions in adjacent electroplating processes. While sulphuric acid itself is not volatile, steam particles easily carry it. The same may be said of the alkali solutions. The effects of such poisonings are local upon the nose, throat and digestion, and especially upon the teeth; as the fumes also incite coughing, they are very predisposing to lung diseases. The solutions are usually not strong enough to affect the skin or eyes, except in the case of overly susceptible persons. The inducement to industrial *alcoholism* depends, first, upon the amount of nausea or gastritis which the breathing of the fumes may produce; second, upon the depressing influences of long hours, lack of good drinking facilities, and washing facilities. The workers perspire very freely. The work is sloppy and steamy.

The general *appearance* of the workers was good in 6 places, fair in 9 others, and bad in the remaining 1. Their chief *complaints* (although a comparatively few complained at all) were irritation of the nose and throat, coughing, heat, fatigue, and breathing of sal ammoniac fumes from nearby galvanizing processes. Our investigators found a considerable number of workers with very bad teeth, as well as pyorrhea, the effects, unquestionably, of the small but constant amount of acid vapors which they breath.

Comments.—In 1 place the employer remarked that "the men get fat on it," but all who were seen were sickly looking, while the Tuberculosis Department in that city had notified us of a case of consumption which had come from the pickling room of this plant. In addition to hoods and stacks to draw off fumes, or drop-partitions around pickling vats, workers should be supplied with every convenience to keep dry, and to enable them to go home properly clothed, such as rubbed boots and aprons while at work, and locker rooms, shower bath quarters, etc., for bathing and changing purposes at quitting time. — See Comments on arsenic poisoning under "Soldering," whenever acids are allowed to act on metals.

GALVANIZING.

Galvanizing consists in the dipping of previously "pickled" sheet, pipes, or other metal ware (iron or steel) into baths of molten zinc, in order to give them a very thin coating of this metal. The process is usually done with mechanical cradles, or other forms of conveyors, but small pieces may be handled by hand.

The process was investigated in 16 establishments. Our report covers 14 establishments, located in 11 cities, employing a total of 724 wage-earners, all males. In a few instances in the state, Galvanizing is done as an independent business, but the vast amount of the work is turned out of Iron and Steel Rolling Mills. The process was very similar in all of the mills investigated.

The employers' interest in workers' welfare was very good in 11 places, while in only 1 did it seem to be quite lacking. The general type of workers was good in 8 places, fair in 3, and poor in 3. In 11 places the workers were very well retained, while in but 2 places, employing a total of less than 20 men, were they of an unsteady character. Health appliances, consisting of hoods with stacks or other arrangements to draw off zinc and other fumes, were found present in 7 places, in 4 of which they were only partly efficient, but in the remaining 7 they were entirely absent. In 5 places instructions along lines of health conservation were given to workers, and in an organized way in 3 places. In 5 places workers had the privileges of sick benefit associations. The work quarters were hygienically well constructed in 10 places, fairly so in 2 others, and not so in the remaining 2, the latter employing a total of 32 workers. Other processes found present in half of the places were: Pickling, Acid Dipping, and some Machine Shop Work. Age-group estimations summed up as follows:

Age Groups.	*No. of Wage-earners*
Over 50 years	2
45 to 50 "	4
40 to 45 "	57
20 to 40 "	661

The *damp* character of the work was a hazard in 9 places, particularly in 1, due to the proximity of the pickling process. The *ventilation* of quarters was good in 2 places, fair in 7, and bad in the remaining 5, due to contamination with various fumes. The *heat* from the process was some hazard in 8 places, particularly in 1, while exposure to *cold* drafts when leaving the vicinity of the galvanizing furnaces and vats was another risk which a majority of the workers ran. The work may be more or less *fatiguing*. In this respect investigators commented upon the following features, arranged in descending order: long hours, hurrying piece-work, monotonous application, constant standing, and, in one or two instances, loud noises as well as laborious work. In most places there was some opportunity of work variation. The workday was found to be 8 hours in 1 place, 8½ in 1 place, 9 to 10 hours in 5 places, 10 to 11 in 3 places, and 11 to 12 in 4 places, while night shifts were the rule in 7 of the places investigated. In 6 of these latter, two shifts made up the twenty-four hours, and in the remaining one, three 8-hour shifts were engaged. The noon recess was 1 hour in 2 places, ½ hour in 7 places, while with night shifts in the other places, it varied from "as desired" to ½ hour. The liability to the contraction of *communicable diseases* had the usual hazards as mentioned under Pickling, although they were rather less present in the places in which galvanizing was seen. The chief hazard in the process is *poisoning,* which may be due to zinc fumes (less marked than in brass founding); lead (a small amount of which is usually added to the zinc bath); to sal ammoniac (used to keep the zinc from burning); and to the fumes from the pickling processes, if located nearby. There was little risk of acute or sudden poisoning from any of these. The risk of slow poisoning was considered negligible in 1 place, fairly so in 7 more, but considerable in the remaining 6. The forms of poisoning which may be present are: "zinc chills", chronic lead poisoning (except to the person who handles lead this risk is only nominal), catarrhal trouble, due to the sal ammoniac fumes, and carious teeth as well as pyorrhea, as noted among the "picklers". The industrial inducement to *alcoholism* is about in proportion to the exposure to fumes, to which should be added the depressing effects of fatigue, long hours, lack of washing facilities, and good drinking water properly supplied.

The general *appearance* of workers was good in 6 places, and fair in the remaining. There were not many *complaints* made by workmen (few could speak English), but these consisted of the irritating effects of the fumes, as well as of "metal chills". The investigators reported specific *occupational complaints,* as follows: 3 with burns, 2 who mentioned "zinc chills", and 1 in whom the breathing of the fumes had produced chronic bronchitis. In addition, skin irritations and ulcers were brought to notice. Foremen in a number of places spoke of "chills", if the zinc got too hot.

Comments.—As stated above, only half of the places were supplied with hoods and arrangements to remove the fumes. While an endeavor is made in all places to keep temperature down, so that the zinc does not burn up, there is some escape from this in most places at different times of the day. The white fumes of sal ammoniac are constantly present. Workers should also be supplied with proper gloves, aprons, and footwear to protect them from burns and other mishaps. In some places they were found equipped with old gunny-sacks for aprons. Where lead is used, workers should be examined at intervals for any evidence of slow lead poisoning. Being hot work, change rooms, shower baths and lockers should be provided.—See, also, comment upon arsenic poisoning under "Soldering", whenever acids are allowed to act on metals.

TINNING.

Tinning or tinplating is a process in which a very thin layer of tin, often largely mixed with lead, and sometimes zinc, is applied to sheet iron, or black plate, or castings. (In some places it was said no lead was used.) Terne plate may contain up to as high as 75% lead. The process varies in different places. The following is the usual method. Sheets from the "white pickle" are dipped (by hand or machinery) into a flux of sal ammoniac, hydrochloric acid and zinc, then into 70% lead (sometimes omitted), then into pure molten tin from which they emerge under a layer of palm oil or other oil. They are next polished and cleaned by hand or in rollers with middlings (bran), ground peanut shells, or sawdust and rags. The hand dipping is done by skilled men who use tongs to hold the sheets.

Tinning was investigated in 13 plants, located in 9 cities, and employed a total of 583 wage-earners (exclusive of "pickling", etc.), of whom 508 were males and 75 were females. The females were employed as sorters (and occasionally as polishers) to pick out the "wasters" after the tinning process was completed. The vast majority of workers were employed at the process in connection with Iron and Steel Rolling Mills, where the black plate was also made in preparation for tinning.

A union organization existed in 1 place investigated. The interest which employers took in the welfare of workers appeared to be very good in 6 places, fair in 5 more, and practically lacking in the remaining place, which also was a big employer. In 8 places an intelligent class of workers was employed, in 2 others fairly so, while in the remaining 2 they were largely ignorant foreigners. The workers appeared to remain steadily in 7 places, fairly so in 3 more, and not so in the remaining 2. Health appliances, consisting of hoods, with vents and sometimes exhausts to draw the fumes off from the tinning vats, were good in 3 places, fair in 3 more, but absent in the remaining 6. In 1 place organized instruction along health conservation lines was given: but very little attention was paid to this in the remaining 11. In 2 places sick benefit associations existed. The tinning quarters were hygienically well constructed in 5 places, fairly so in 3 more, and not so in the remaining 4. In 2 places other processes, such as pickling and polishing were carried on in the same quarters. The vast majority of workers were between 20 and 40 years of age, while a few were under 20.

Dust, dirt and disorderly surroundings, *dampness* (water, steam and humidity), *heat* (from the process itself), exposure to *cold* (by drafts and having to go to outside closets), and poor *lighting* arrangements — all of these constituted from fair to bad hazards in from ⅓ to ½ of the places investigated. General *ventilation* was good in 3 places, fair in 5 more, but poor in the remaining 4, due to contamination with the fumes of oils and greases used, and metals, as well as to deoxidation through the presence of furnaces in confined work quarters, and to the lack of means of keeping the air in circulation. In 2 places steam was excessive. *Fatigue* seemed to be a fair hazard in 5 places and considerable in the remaining 7, the chief reasons being hurrying piece-work in monotonous and straining manipulations, and less often long hours, noise, constant awkward positions, and occasionally jarring work. The workday was found to be 8 hours in 1 place, 8 to 9 hours in 3 places, 9 to 10 hours in 1 place, 10 to 11 hours in 4 places, and 11 to 12 hours in the remaining 3 places. Night shifts were the rule in several of the large places. The noon recess was 1 hour in 3 places, about ¾ hour in 6 places, and ½ hour in the remaining 3. Constant standing in the case of females while inspecting, polishing and sorting sheets of tin was also noted. Eyestrain, due to glancing of light on the polished sheets of tin, as the females turned them. over, was present. The liability to the contraction of *communicable diseases* seemed a fair hazard in 8 places and considerable in the remaining 4, due to such factors as promiscuous spitting about the floors, the absence of cuspidors, the great inadequacy of washing facilities, and the little attention paid to toilet arrangements in several places, and occasionally to crowding. There was great liability to cuts and burns of all grades of severity with consequent pus infections, blood poisoning, erysipelas, etc. There was a risk of infection from rags used for polishing purposes. Furthermore, but few of the workers were under medical supervision. Practically the only females found employed in Iron and Steel Mills were in this division of the work. They were very largely immigrant girls. The *poisons* used in the tinning process were found to be lead, zinc, tin (there is a question as to this last metal's being a poison), hydrochloric acid, and sal-ammoniac fumes, in addition to the escape of fumes and gases from furnaces in some places. Some risk of poisoning existed in all places, and particularly so in 6. Those who handled lead directly, or terne plate, very rich in lead, were the most exposed, but there was some risk around the pots from the breathing of lead vapors, created by the constant stirring up of the tin-lead alloy, near which the workers were necessarily closely stationed. The risk of "zinc chills" was also present. The ignorance of the workers, the practice of using palm oil to wash the hands (thus greatly favoring lead absorption through the skin), the lack of instructions concerning the danger of lead poisoning, the lack of medical supervision, and, in several places, the great inadequacy of washing facilities, were other important factors in the risk of poisoning. The industrial inducement to *stimulantism* seemed present in practically all places and was influenced chiefly by the exposure to the poison factor, as well as heat, long hours, poor washing facilities, and fatigue, while the character of the drinking water supply was bad in some places. In others, bubbling fountains were the rule.

In all large places some workers were seen who were decidedly under par physically, but the general average was good. The *complaints* of the workers were not numerous, but consisted of poor ventilation, breathing of fumes, working in steam, lack of heat in the winter time, the loss of time from various forms of sickness, metal burns, zinc chloride burns, etc. Our investigators reported the following *occupational disease* cases: lead poisoning, 4 positive, 1 tentative; lead and zinc poisoning, 3 tentative. There were also some hearsay cases of lead poisoning. In 1 place employing only a few men, but 1 worker had remained for two years, and he stated that because of the lack of ventilation he had seen 200 men come and go in that time. Undoubtedly his statement was considerably overdrawn, but there was considerable exposure at the place. *Comments.*—Greater precautions should be taken in tining than in galvanizing because of the large percentage of lead which is customarily used. By all means should all alloy pots be well hooded and vented. Washing facilities should include shower baths for those at the hot work. We are confident that for a physician to see each worker for three to five minutes once a month, the gradual progress of slow lead poisoning, which is certainly present in a good percentage of the workers, could be prevented.

ACID DIPPING.

Acid dipping is a process preliminary to electroplating, in which metal pieces are dipped into jars or vats of acids (usually a strong mixture of the inorganic acids, HCl, HNO_3, and H_2SO_4), in order to cleanse the surfaces from oxides and corrosive deposits, and other accumulations. The process differs from "pickling", chiefly in that acid dipping is done in cold, strong acid solutions, and smaller objects are usually so treated, while in "pickling", hot solutions of weak acidic character, sometimes with alkaline treatments as well, are used. Acid dipping is usually done by hand or some form of holder; pickling, by mechanical means. Acid dipping is a very rapid process, requiring but a moment for a dip, while pickling takes from five to twenty minutes or more in each solution.

We here report upon this process as investigated in 5 establishments, in 3 cities where it was found to employ a total of 32 workers, all males. There was a tendency to employ youths at the process, although there were 4 persons observed who were over 40 years of age. Even in the largest establishments the process requires but very few workers. It is also more or less discontinuous, as a rule. In the places investigated workers appeared to remain well in most instances. There were good health appliances in 3 plants, but these were absent in the remaining 2 where a total of 8 men were employed. In 1 place the 8 or 10 employes so engaged had the privilege of a sick benefit association, and their general care was well supervised. The work required very little skill and in 3 places a very ignorant type of workers was so employed. The work quarters were hygienically well constructed in all except 1 place. In large places the process was by itself, while in others it was usually found in a corner of the plating room, or polishing and buffing rooms.

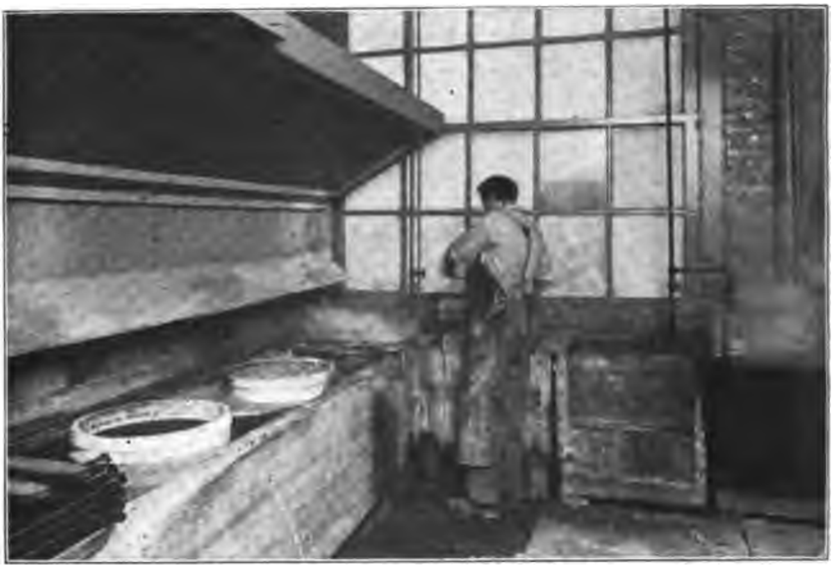

FIG. 44. ACID DIPPING IN PLATING ROOM.
Slot ventilator along wall connected with powerful exhaust. Note slatted floor treads. Aprons and gloves furnished.

The chief hazard is the breathing of strong, mineral acid vapors, which are created by dipping metals into such acids. In a number of instances the vapors were clearly visible as the very poisonous brown vapors of nitroso-nitric acid. In neutralizing, vapors were also created from alkaline baths (NaOH). In plating rooms there was also the risk of potassium cyanid and other poisons used. The liability to *poisoning,* particularly from acid vapors, was considerable in 1 place, and fairly so in 3 others, due either to the absence of a ventilating hood having good draft, or to the carelessness of the workers in creating and distributing vapors, particularly where such were not plainly visible. In one place the work was done in front of an open window where the breeze drove the vapors directly towards the worker. Other hazards to acid dippers were the *dampness* of quarters, due to the vats of rinsing water, often splashed upon the floors, and the humidity from steam arising from hot water cleansing baths. All workers were found to be engaged from 9 to 10 hours, while in 3 places the noon recess was only ½ hour.

Comments.—Acid dippers should be protected by a good hood and local exhausts, or other very efficient means of confining the vapors; also with rubber gloves, rubber aprons, and perhaps rubber boots, if the work is of a splashing character at all. It must not be forgotten that a single exposure of only a few moments to breathing nitroso-nitric acid vapors, may result in pneumonia within 24 hours, or, later, to a permanent nervous affliction, characterized by constant tremors. The situation is similar to exposures which firemen suffer when carboys of acids are broken in storage rooms and other places during fires. In the recent New York disaster, in which a hundred persons or more were exposed to breathing nitric acid vapors in a sub-way accident, the subsequent death rate was over 25%, all of which followed between a few hours to a week afterwards.—See also, comment on arsenic poisoning under "Soldering" wherever acids are allowed to act on metals.

ELECTROPLATING.

The process of electroplating consists in placing the metals to be plated in a solution of an electrolyte through which an electric current is passed. The electrolytic solution is usually contained in rectangular shaped tubs or vats which stand about waist high, and the objects are hung in the solution for a period of hours. The electrolyte varies in composition according to the metal to be deposited.

The process was investigated in 43 firms in 7 cities and engaged 532 wage-earners, of whom 510 were males and 22 were females, (the latter all employed in one place where plating, buffing and coloring lead composition ornaments was done). Comparatively few employes are required for the process even in large stablishments. The industries covered were Art Glass; Automobiles; Bolts and Nuts; Brass and Bronze Products; Cash Registers; Coffins; Copper; Tin, and Sheet Iron; Electrical Apparatus; Electroplating; Foundry and Machine Shop Products; Furniture; Instruments; Regalia; Signs and Advertising Novelties; Stereo—and Electrotyping; Stoves; Safes and Vaults; and Wire Manufacturing.

In 2 of the places investigated unions existed. The employers' attitude toward welfare of workers appeared very good in 26 places, fair in 12 more, and not good in 4 places. The general type of workers was an intelligent class in 29 places, and fairly so in 10 more (not reported upon in 3). Practically all of the workers were skilled in 8 places, and a majority of them in 15 more, but in 20 plants a large percentage of unskilled workers were employed. In all but 4 places, workers appeared to be retained fairly steadily at the process. Health appliances, consisting of hoods and vents, particularly over hot cyanide solutions, and over steaming rinsing tubs, and occasionally room exhaust fans were found present in 23 places, in 18 of which they were very efficient. They were absent in the remaining 20, in a few of which they were not needed. In 8 places some instructions were given in health precautions, but the workers were very ignorant of the exposure to poisons in most of the balance. In a like number of places sick benefit associations existed. The general construction of workrooms was hygienically good in 19 places, fairly so in 6 more, and not so in 15 (the remaining 3 not reported upon). In 21 establishments other processes were carried on in the same quarters, such as Polishing and Buffing, Lacquering and Shellacing, Acid Dipping, Enameling, Electrotype manufacture, storage, etc. The age-group estimations summed up as follows: over 40 years, 70; under forty, 462, of whom about 10 per cent were under 20 years.

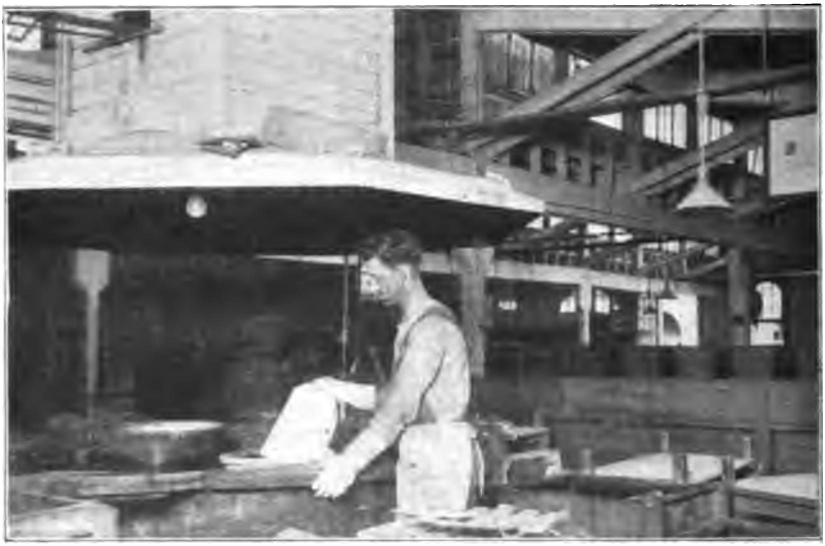

FIG. 45. ACID-DIPPING IN PLATING ROOM.

Note ventilator over acid jars. Rubber gloves and apron furnished. Note also health placard (overhead to the right).

In 9 places, *dust,* which was due to the presence of other work, constituted a hazard to the electroplaters. Quarters were kept orderly and fairly well *cleaned* in all but 2 places. While *water* and *steam* are necessary features, these constituted no hazard in 20 places, and were a bad feature in only 7, where enough provision was not made for drainage from the floors, or the removal of steam from the air, or the workers were not supplied with proper clothing. Some quarters were very humid and were not supplied with foot treads or grates to keep the feet off the wet floors. Quarters were well *lighted* in 33 places, fairly so in 4 more, and not so in the remaining 6. The character of the workroom *ventilation* was fair to good in 21 places, but this could not be said for the remaining 22. Usually, contamination with steam, vapors from the tanks, fumes from acid dipping in the same quarters and from other processes were the reasons for vitiated atmosphere. In 6 places it was somewhat warm, but this was not much of a hazard any place. Going home without changing the clothing from the wet and steamy rooms was more of a hazard than heat while at work. *Fatigue* was not found to be much of a feature in electroplating, but prolonged faulty postures, monotony, and constant standing were some feature. As a rule electroplating was diversified work. The workday was 8 hours in 9 places, 8 to 9 hours in 12 places, 9 to 10 hours in 23 places, and 10 to 11 hours in 2 places (three not reported upon). The noon recess was 1 hour in 27 places, about ¾ hour in 9, and ½ hour in the remaining 6. The risk of contracting *communicable diseases* was graded as fairly negligible in 27 places, but more or less bad in the remaining, the chief reasons being the use of common drinking cups and towels, poor closets, inadequate washing facilities, and the absence of cuspidors. In some places workers at small work were crowded together, while a large percentage of the workers were under no medical supervision. On account of wet floors and the absence of dust in most places, the risk of spreading disease through spitting was not great. The liability to *poisoning* was considered to be negligible in 10 places, fairly so in 19 more, but a quite evident hazard in the remaining 14. The types of poisons were potassium cyanide in hot solutions, acid fumes, alkali vapors, copper sulphate, and working with lead (in a few places), while fumes from other processes such as lacquering and acid dipping were frequently present. The industrial inducement to *alcoholism* or other forms of *stimulantism* was considered as negligible in 16 places, and fairly so in 22 more, but the breathing of fumes and vapor, the hot steamy atmosphere in some places, and the rather long hours, especially for young persons, were conducive to this where they existed.

The general *appearance* of the workers was on the average good in 20 places, fair in 17 more, and not good in the remaining, including one or two where large numbers of employes were engaged. *Complaints* from employes were quite numerous and were as follows: breathing acid fumes, dampness, cyanide ulcers, coughs, colds, throat trouble, nasal irritation, dizziness and headache. In some instances our investigators suffered from difficult breathing and severe headache for several hours after these inspections in plating rooms. Investigators reported a total of 8 *occupational afflictions* which they came across as follows: cyanide ulcers, 4; chronic eczema, 2; lung disease, 2. *Comments.*— On the whole, work in electroplating is not as dangerous as might be expected from the nature of the poisons which are used. An attempt should be made to keep the atmosphere in workrooms as nearly normal as possible by providing hoods and vents over hot solutions, acid dipping places, for the escape of steam, etc. While females are rarely employed at this process, in many places they were engaged in lacquering and other processes in the same quarters where plating fumes were quite noticeable. Where the processes are necessarily wet and sloppy workers should be provided with the usual means to protect themselves, such as rubber aprons, boots and raised floor tread. Gloves should be supplied for protecting the hands from cyanide solutions, especially where alkalis are also used. Personal carelessness on the part of the workers and lack of instruction are other reasons for dangers to health.

In ELECTROTYPING, the design is impressed into wax, this dusted over with graphite powder, then electroplated (usually a copper or nickel deposit is made upon the graphite), then the wax is removed and the thin metallic impression mounted on a lead back, and this fastened to a block of wood. Besides the hazards of electroplating there are those of graphite dust and lead (the latter melted in a pot, ladled out into moulds, cooled and handled).

(To be continued.)

TYPHUS FEVER.*

Its Etiology and the Method of Its Prevention.

By John F. Anderson, *Director.*

Hygienic Laboratory, United States Public Health Service.

The subject that I have chosen for my address is at once an old one and a new one. It is old because the disease has been known for a great many years, even back to the time of the Great Plague in London, many deaths during that great epidemic having been undoubtedly due to typhus fever. It is new because of certain recent additions to our knowledge of the etiology, method of transmission, and distribution of the disease.

Typhus fever has been confused, especially, with two other diseases, namely, relapsing fever and typhoid fever. The distinction was first clearly drawn clinically between relapsing fever and typhoid in Ireland about 1826, and their nonidentity was conclusively settled by the discovery of the spirillum of relapsing fever in 1868. Gerhard, in 1837, was the first to set forth clearly the clinical and pathological differences between typhoid and typhus fevers, and the discovery of typhoid bacillus by Eberth in 1880 definitely established this distinction.

The disease has been the subject of a large amount of painstaking and careful work without any very great advance having been made in our knowledge of it until the latter part of 1909, when Nicolle infected a chimpanzee with blood drawn from a human case of typhus fever. Sometime later, working with Comte and Conseil, he reported the successful transmission of typhus fever from one monkey to another by the bite of the body louse.

Just about that time the studies of Goldberger and myself were begun in Mexico City and we were not aware of the work of Nicolle and his co-workers until after the publication of our first two notes. We found, contrary to the first reported experiments of Nicolle, that the lower monkeys, such as the rhesus and capuchin, could be infected by inoculation of blood drawn directly from human cases of the disease, and without the passage of the virus through one of the higher apes, such as the chimpanzee, as was claimed to be necessary by Nicolle. We found that one attack of Mexican typhus in the monkey conveyed a definite immunity to subsequent attacks and, in our opinion, the epidemiological evidence pointed unmistakably to the correctness of Nicolle's observations as to the part played by the body louse in the transmission of the disease.

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* Reprint, Public Health Reports, 1915.

Just at this point our work in Mexico was interrupted by the illness of Dr. Goldberger with typhus and after his recovery his condition was such as to necessitate our return to the United States. For this reason our work on typhus fever was discontinued, as it was not believed that cases of the disease, except at rare intervals, occurred in this country.

About this time, however, Dr. Nathan E. Brill published a paper giving the results of a study of 221 cases of an acute infectious disease of unknown origin observed by him in the wards of Mount Sinai Hospital during several previous years. He had previously reported 17 cases of the same disease. The important features of the disease, as observed by Dr. Brill, are so well summarized in his definition that I shall quote it:

> An acute infectious disease of unknown origin and unknown pathology, characterized by a short incubation period (four to five days), a period of continuous fever, accompanied by intense headache, apathy, and prostration, a profuse and extensive erythematous maculo-papular eruption, all of about two weeks' duration, whereupon the fever abruptly ceases either by crisis within a few hours or by rapid lysis within three days, when all symptoms disappear.

In a third Brill reported on a study of 34 additional cases observed since the 221 reported in his second paper. This paper was of especial interest to us, as it gave the results of the inoculation of monkeys with material obtained during life and at autopsy from cases of the disease and it gave the postmortem findings in the fatal case. When Brill's second paper appeared in April, 1910, we had recently returned from the City of Mexico where we had seen many cases of typhus and we were struck by the very remarkable resemblance between the disease described by Brill and typhus fever as observed by us in Mexico and as observed by one of us in certain places abroad. For this reason we endeavored to obtain access to cases of Brill's disease for purposes of study in order that we might determine if possible their relationship to typhus. A case was finally seen in the wards of Mount Sinai Hospital and blood was drawn from the arm vein of this patient and used for the inoculation of monkeys. One of these animals, after an incubation period of 10 days, developed a fever which reached its maximum six days later and fell by rapid crisis 14 days after the rise began.

Blood was drawn from this animal and used for the inoculation of other animals which, after an incubation period of nine days, developed a fever which, in its rise, duration, and termination, was similar in all respects to that in the monkey first inoculated. Since then this strain of typhus fever has been passed through 76 monkey generations and over 150 generations in the guinea pig.

After intraperitoneal or intravenous inoculation of infective blood into a monkey there follows an incubation period of 5 to 14 days. At the end of this time there is usually a rapid rise of the animal's temperature, which not infrequently reaches a maximum in 36 to 48 hours of 41 to 41.5° C. The temperature remains high until toward the end of the febrile period, when it may show a gradual decline; but it usually declines by crisis or rapid lysis, frequently to subnormal.

Convalescence is usually rapid. We have never noticed the presence of an eruption, although careful search has been made for the same. In other words, the fever is the only definite index of a reaction. Although apparently a mild disease in the monkey, we have had four deaths in a total of 105 cases of typhus in that animal.

After we had established the susceptibility of the rhesus monkey to infection by inoculation with blood from a case of Brill's disease it became important to determine the relationship of Brill's symptom-complex to typhus fever, and for this purpose we tested the susceptibility of animals that had recovered from Brill's disease to Mexican typhus, as well as the converse of this. It was found that an attack of Brill's disease in the monkey conferred a definite immunity to infection with Mexican typhus, and that an attack of Mexican typhus in the monkey conferred a definite immunity to an attack of Brill's disease. In other words, Brill's disease, so called, and typhus fever are identical.

The results of these cross-immunity tests having plainly justified the conclusion that the disease described by Brill was identical with the typhus fever of Mexico, and inasmuch as the New York strain of typhus was undoubtedly of European origin, the further conclusion was made that the typhus fever of Europe and the typhus fever of Mexico are identical.

During the progress of the work necessary for the demonstration of the identity of the two diseases, a number of related problems were given attention. Among the first of these was work upon the method of transmission. It was found that the so-called Brill's disease, as well as the typhus fever of Mexico, could be transmitted to the monkey by the bite of body lice which had previously been allowed to feed either on human cases of the disease or on monkeys sick with typhus fever.

Attempts have been made by various workers, including ourselves, to transmit the disease from monkey to monkey or from human beings to monkeys by the bite of insects other than the body louse. The experiments with fleas and bedbugs have been frankly negative, and the experiments with the head louse by Goldberger and Anderson, while highly suggestive, were not conclusive.

Since the body louse has been shown to be the means by which typhus fever is transmitted, it has been possible to put into effect practical methods of preventing typhus which, when intelligently applied, have worked remarkable results. Thus the disease, which has always been endemic in Tunis and which each year has carried off a large number of victims among the native population, has now almost disappeared. According to Nicolle, in 1909 there occurred in Tunis 838 cases of typhus fever, but in 1912, after the efforts to control the disease in the light of recent researches had been put into effect, there occurred only 22 cases. The only prophylactic measure resorted to has been the systematic destruction of lice found on persons (and their clothing) in the vicinity of patients suffering from typhus.

Typhus fever has always been one of the great plagues of military camps, particularly in the temperate zone, and it is more than probable that, unless the newer methods are adopted for the control of the disease in the large armies now engaged in warfare in Europe, the disease may become a scourge among the troops. This is particularly true, as typhus fever is known to be endemic in certain German, Russian, and Austrian Provinces and in eastern Europe.

The experimental work of various investigators of typhus fever has shown conclusively that the virus of typhus is present in the blood, at least throughout the febrile period, and we have found that the blood of the monkey may still be virulent from 24 to 32 hours after the return of the temperature to normal, but that the blood of the animals in the instances tested by us was not virulent in the prefebrile stage. The infective agent is present in the different elements of the blood; that is to say, the blood serum collected by defibrination and centrifugation or by clotting, the washed blood corpuscles, and the leucocyte layer all contain the infective agent in about equal proportions.

The virus in the blood is not very highly resistant. If has been found that drying for 24 hours and heating at 55° C. for five minutes deprive it of infectivity.. It may resist freezing as long as eight days.

We made a number of experiments to determine the filterability of the infective agent as it exists in the blood serum and we believe that the virus of typhus fever is not filterable and that therefore the infective agent is of a size sufficiently large to be seen with the ordinary powers of the microscope.

I have referred to the fact that the guinea pig is susceptible to infection with typhus fever. This is of importance because I have suggested that the inoculation of this animal with blood drawn from cases of fever giving a negative Widal and a negative blood culture for the typhoid bacillus will be of value in the diagnosis of suspected cases of typhus fever.

Now, just a few words in regard to the clinical differences between typhus and typhoid. This may be of special significance to the clinician. Both the older and the more recent history of the disease testify to it great clinical likeness to typhoid.

As a rule, the onset of typhus is more abrupt than that of typhoid fever. It is common in typhus to find a history of well-being on going to bed and of rising in the morning with a severe headache and malaise which, within a few hours, compel a return to bed. Chilliness or a distinct chill are common at the onset of typhus, very much more so than in typhoid. Headache with or without chilliness and with or without malaise almost invariably marks the invasion of typhus. Indeed, the patient may complain of little else, either at the beginning or throughout the course of the disease.

In marked contrast to typhoid, the face is flushed and the conjunctivæ are congested in the first few days as the result of a capillary congestion not unlike that seen at the onset of dengue or of yellow fever.

The temperature rises rapidly, very abruptly indeed, and with it the pulse rate. In typhoid the evolution of the fever takes longer as a general thing, and the rise in the pulse rate is sluggish and not in proportion to the fever. The fever does not as a general thing range at high levels. In this, as well as in some features of its onset, typhus strikingly resembles yellow fever. The duration of the fever is about twice that of yellow fever and about half that of typhoid, namely, about 14 to 16 days. The defervescence also suggests yellow fever, except that it is not infrequently critical in typhus. Some of the older descriptions of typhus give the impression that a critical defervescence is invariable; this has not been our experience as we have seen typhus in Mexico.

An important distinction relates to the eruption. The eruption of typhus appears within three to five days after the onset, therefore earlier than is the rule in typhoid; it is general, sparing only palms and soles; its evolution is rapid, being fully out within 24 to 36 hours, and is permanent, in marked contrast to the typhoid eruption which appears in successive crops. It is important also to recall that the macules constituting the typhus eruption are polymorphic. They have not the regularity of outline or the uniformity of size and appearance of the typhoid rose-spots. Moreover, while most or all of the lesions may fade markedly on pressure in the early stages, some fade little if at all, and the proportion of these may and usually does rapidly increase, the eruption becoming petechial as it becomes older.

Recently, Plotz, working at Mount Sinai Hospital, has reported the cultivation of an organism from cases of typhus, using special anærobic methods. Should his work be confirmed it is possible that methods may be developed, using the organism, for the serum treatment of cases and perhaps a vaccine may be devised that will be of value for prophylactic purposes.

Brill, in his three papers, has reported the observation of 254 cases of so-called Brill's disease, which we now know to be typhus fever in the wards of Mount Sinai Hospital between the years 1896 and 1910. Eighteen cases were reported by Louria at the Jewish Hospital, Brooklyn, during the summer and fall of 1910. Cases have been reported from other hospitals in New York City, Chicago, Milwaukee, Washington, Atlanta, Providence, Boston, and points in Virginia and Indiana.

Roger Lee, in a study of the case records of the Massachusetts General Hospital for the 10 years from 1902 to 1912, concluded that typhus fever in mild form had been present in Boston and vicinity during that time. He found, in his study of the records of 1,404 cases of continued fever of a greater duration than seven days, 28 cases which correspond exrtemely closely with Brill's description of typhus fever. This gave a ratio of 1 case of typhus to 47 cases of typhoid.

There is reason to believe that this same ratio would hold, not only for cases of typhoid fever in Boston, but for typhoid fever in other large cities of the United States. If we assume that the ratio of 1 case of typhus to 47 cases of typhoid, as found by Roger Lee in the Massachusetts General Hospital, holds for certain other large cities, we may estimate for 1912, based upon the reported cases of typhoid fever, that there were present in New York City for that year 72 cases of typhus, in Baltimore 22, Boston 10, Chicago 22, and Philadelphia 34.

That this is not altogether an unwarranted assumption is evident from the fact that, according to the reports from two hospitals in New York City, 36 cases of typhus were treated at Mount Sinai Hospital and 19 cases at the Jewish Hospital in the year 1912. The ratio of cases of typhus to typhoid in the Jewish Hospital for that year was about 1 to 2.3 instead of the ratio of 1 to 47, as found by Lee in Boston.

From this it is evident that typhus fever, instead of having disappeared from the United States, is present and has been present for years, at least in the large cities. This hardly need occasion any surprise when we recall how frequently the presence of certain diseases may be overlooked, as is shown by the history of pellagra and hookworm disease in this country.

There is no experimental evidence to support the view that typhus is acquired in any manner other than by the bite of lice, which have previously fed on a person sick with the disease. This being so, in our prophylaxis it is necessary only that we keep this important fact clearly in mind, and by so doing we may readily deduce the fundamental procedures on which prevention may be based.

In my opinion it may safely be assumed that association with a case of typhus, in the absence of the transmitting insect (the louse), is no more dangerous than association with a case of yellow fever or malaria in the absence of the proper species of mosquito.

All our efforts at prevention, therefore, are centered upon the louse, and these efforts may be broadly grouped under the following headings:

1. Measures for the reduction of lice infestation among the population in general.
2. The destruction of all lice and their eggs found on the bodies, clothing, bedding, and surroundings of all cases of typhus, typhus suspects, and contacts.
3. The adoption of measures, by persons in the vicinity of cases of typhus, to reduce or prevent the possibility of their being bitten by lice.
4. Inoculation with the mild type of the disease (Brill's disease) by persons contemplating entering localities where the disease is prevalent. Should Plotz's work be confirmed the use of a vaccine prepared from the typhus-fever germ may be substituted for this.

The measures to be adopted under the first heading are, to a considerable extent, educational, except in institutions and places over which the sanitary authorities have supervision, such as bathhouses, lodging houses, and other places where numbers of persons may gather.

In surroundings where lice may be found, systematic efforts should be made for the destruction of lice and their eggs. These efforts consist in the use of insecticides, both chemical and physical, bearing in mind the important point that the louse requires frequent feeds of blood and therefore is most apt to be found on recently used clothing or bedding. It is not difficult to kill when exposed to insecticides, while its eggs are much more resistant to chemical agents, but are destroyed by heat or steam.

Under the second heading comes, first of all, the institution of measures requiring the propmpt report to the sanitary authorities of all cases or suspected cases of typhus fever. Such cases should be promptly seen and the inspector should be satisfied that the patient's surroundings are free from lice, in which case the patient may without danger to the community, be treated at home. If, however, such is not the case, or there is doubt, the patient should at once be removed to a hospital and the place from which he is removed be treated to destroy all lice and even their eggs. For the treatment of materials, such as clothing and bedding, the use of steam is the method of choice. All suspects and contacts should be bathed, the lice and their eggs in the hair being destroyed, and then be given a change of clothing, and their old clothes disinfected. They should be kept under observation for at least 12 days.

The measures to be adopted under the third heading are such as should prevent or minimize the possibility of persons near cases of typhus being bitten by lice. It should be borne in mind that the louse has not the radius of action of the mosquito or even of the flea; and therefore the striking distance of typhus is shorter than that of yellow fever, malaria, or plague. For the transference of lice from one individual to another, rather intimate association with the lice-infested person or his surroundings is necessary; and by reason of the fact that the louse requires frequent feedings to maintain life, this means, for practical purposes, surroundings recently occupied by persons, and possibly by animals.

There is but little to say in regard to the procedures suggested under the fourth heading. The case mortality of the mild form of typhus (Brill's disease), so widespread in the United States, is very low, probably not over 1 per 100 attacked, while the case mortality in Serbia, for example, is possibly 20 or perhaps more per 100 attacked. For this reason alone (and there are other reasons) the advisability of inoculation with the mild form of typhus would certainly seem worthy of serious consideration for those going to places where typhus is prevailing in a virulent form.

THE HARRISON ANTI-NARCOTIC LAW.*

The Effect of Its Enforcement on the Drug Addict.

By Murray Galt Motter,

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As was to be expected, the coming of March 1, 1915, with its attendant restrictions upon traffic in "opium or coca leaves, their salts, derivatives, or preparations," has brought numerous comments and criticisms, not to say protests. It is interesting to note that, prior to this date, a very extensive campaign of education was conducted by members of the drug trade, for the purpose of informing their fellow members, members of the medical, dental, and veterinary professions, and all concerned, as to the workings of this law and the steps to be taken to keep within its bounds. In many instances there was at first a rather widespread resentment at this extension of governmental control, and its consequent limitation of individual and professional rights and practices. Some physicians even protested that they would not register under the act, but would continue to practice as heretofore, being licensed thereto by the recognized State authorities. Wiser counsels prevailed, however, and it was realized that none of these narcotics could lawfully be "produced, imported, manufactured, compounded, sold, dispensed, or given away" until all the forms and formalities of the law had been complied with.

It has long been recognized that every restrictive measure must, of necessity, impose hardships upon some one; and that, not infrequently, the hardship is most irksome to those whose sense of right and justice would alone prohibit the prescribed practices, without legal enactment. It may be conceded that the taking of inventories, the annual tax, the registration, the special-tax stamps, the recording of certain additional data, and the keeping of these records for a period of two years, subject to official inspection, are, to say the least, annoyances. At the same time, it is significant that the urgent need of some effective means of staying the increasing ravages of drug habits has been equally well recognized. Those members of the medical and allied professions, whose experience and observation best qualify them to speak, are heartily in favor of the law. They admit that, prior to its enactment, the case of the "dope fiend" was well-nigh hopeless, because any method of treatment was nullified by the fact that the "fiend" could get his "dope" without difficulty; whereas now there is fair prospect of effective control, both of the "dope" and of the "fiend."

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* Reprint, Public Health Reports, 1915.

Just here, however, another factor enters which is of great and urgent importance. Whatever the beginnings of his or her downward course, the confirmed victim of the narcotic habit is a pitiable object, who may well excite the sympathy of all humanity. An outcast, an Ishmaelite, often depraved, always deplorable, against whom the doors of the general hospital have been closed, he is a disgrace to his family and friends, a nuisance to his medical adviser, and sometimes a menace to the community. A mental, moral, and physical wreck, obsessed with his desire for his "dope," full of deceit, intrigue, and trickery, which have enabled him to get it, he has been preyed upon by human harpies who for gain have, despite the law, supplied him with the means of self-destruction. Sympathy for these "sufferers" has already given voice to an appeal for some alleviation of the law's restrictions in their behalf. In some instances these appeals have been almost hysterical, going even to the extent of a demand for the repeal of the law itself. Naturally, this line of argument will be taken advantage of by the makers and vendors of dope-laden patents, proprietaries, and household remedies, who have hitherto eluded all previous laws on this subject, and whose revenues will be enormously curtailed if this new law be strictly enforced. Appeals have been made for the throwing open of certain Federal hospitals for the benefit of the victims of the drug habit; others that a home cure be placed in the hands of physicians.

After all, the remedy for the present condition lies well within the hands of the medical profession, and the really reputable hospitals and institutions already organized. If the law be strictly enforced, and the supply of "dope," through other than proper channels, absolutely cut off, the medical practitioner has an opportunity such as he has never before had.

Whether institutional or home treatment will prove the more practicable is a question which must be determined by actual trial in each individual case, guided by the particular conditions therein appearing.

Just because these conditions do vary in each case, no rule-of-thumb method can be adopted. The general principles which can be applied in any case are (1) to gain, if possible, the confidence of the patient and secure his obedience to instructions; (2) to eliminate any drug which may remain in his system; (3) to repair the wreck caused by the drug, through hygienic, dietetic, and perhaps medicinal measures adapted to the special needs of the particular case. Whether in any given case the drug can at once and finally be withdrawn is a question which the attending physician alone can determine. Granted that the law is enforced, the supply is wholly within his control, and none can gainsay nor interfere with his right to administer any narcotic when and where he deems it necessary.

The so-called "cures" are legion, and in their very multiplicity is the surest evidence of their futility. The drug habit, long maintained, produces profound changes in the economy. The very hopelessness of the task, so long as the cause of the trouble was widely distributed and easily accessible, led to a certain indifference and carelessness in the application of remedial measures. The problem must now be attacked from a new vantage point. Hospitals hitherto closed to this class of patients are already realizing their responsibilities in the premises, and rules as to admission have been modified. Too much stress can not be laid upon the principle, so clearly outlined by Dr. Alexander Lambert that "Each individual case has its own separate problems"; and his methods and results are worthy of study and trial.

Whatever else be done, care should be taken that in discussion or action nothing be said or done which shall weaken the law or strengthen quackery, whether individual or institutional. Time must be allowed in which to put the machinery of the law in smooth running order. When this is effected and everyone fully informed, a careful survey of its workings in a dozen or more large centers of population, followed, if necessary, by ruthless infliction of penalties upon its violators will have a most enlightening and salutary effect. Then and not until then will there be any real hope for the drug addict. No sentimentalism, no greedy commercialism, should be allowed to deprive him of this chance.

MINUTES OF THE MAY MEETING.

The regular meeting of the State Board of Health was held in Cincinnati May 4, 1915.

A hearing was given to a delegation representing the council of the city of Akron, in reference to modifications of plans for a sewage treament plant to be constructed in compliance with an order of the State Board of Health. A request is also made for an extension of time within which to complete the plant. Upon consideration of the statements presented by the delegation, the Board adopted an amended order allowing eighteen months additional time for the completion of the sewage treatment plant and instructed the Division of Engineering to make an investigation of the proposed modification of plans. The council is required to file with the Board for approval the revised plans and specifications and the city has been advised to proceed as rapidly as possible with the construction of those parts of the plant which are not concerned in the modification.

Dr. C. D. Selby, of Toledo, and Dr. W. G. McDade, of East Liverpool, were appointed as inspectors to assist in carrying out investigations of industrial health hazards in their respective cities. Dr. William H. Peters of Cincinnati was appointed as medical inspector to succeed Dr. Casper Hegner.

The minutes of the March meeting and the monthly and financial reports of the Secretary were approved.

Plans were approved for sewerage and a sewage treatment plant for the Mantua Township Centralized School in Portage County with the provision that the plant be given competent supervision and that it be enlarged when deemed necessary by the State Board of Health.

The Board voted to withhold approval of plans for proposed fire protection connections from the distributing system of the public water supply at Kenmore to the distributing systems of the B. F. Goodrich Company, Mill No. 3, and the Colonial Salt Company.

The Board voted to permit the installation of the proposed connections for trial and temporary use, subject to the following conditions:

1st. That the check valves and accessories shall be installed in strict accordance with specifications of the Associated Factory Mutual Fire Insurance Companies;

2nd. That no connection shall exist on the mill side of the check valves whereby water may be taken from the fire service distributing system for industrial use;

3rd. That immediately following the installation of the proposed check valves a careful inspection shall be made by an expert to determine the watertightness of the valves, and that any defects found shall be properly corrected to insure watertightness;

4th. That each installation shall be properly tested by the superintendent of water works of the village of Kenmore at intervals not greater than one week until the safety of the installations has been indicated, and thereafter at intervals not greater than thirty days; and

5th. That the proposed connections and check valves shall be removed when deemed necessary by the State Board of Health to protect the public water supply of the village of Kenmore from pollution.

Plans were approved for a proposed new water supply intake for the city of Sandusky, subject to the conditions that the intake line shall be extended to a suitable location in Lake Erie if, following the completion of intercepting sewers and sewage treatment works, such extension shall be found necessary by the State Board of Health and that no connections shall be installed whereby the water obtained from the proposed new intake can be pumped without filtration into the distributing system of the city. The existing connections of the present intake line are to be abandoned and removed. The city of Sandusky is advised of the importance of constructing at the earliest possible time an intercepting sewer along the northeast water front of the city to divert from the existing outlets sewage now discharged into Sandusky Bay in close proximity to the proposed intake.

General plans were approved for a proposed system of sanitary sewers for the village of Brewster with the condition that the village council pass and enforce an ordinance regulating the proper use of sanitary and storm water sewers; to provide for the issuance of permits; the maintenance of records, and for competent supervision of the sewerage system. Detail plans of the sewers are to be submitted for approval.

The Board approved plans for a proposed system of sanitary sewers and a sewage treament plant for the village of Chardon upon condition that adequate means for flushing the sewers shall be provided; that every precaution shall be taken to secure watertightness of the sewers, and that the village council pass and enforce an ordinance regulating the proper use of sanitary and storm water sewers. It is also required that the sewage treatment plant shall be enlarged when deemed necessary by the State Board of Health.

Plans for proposed sewerage and a sewage treatment plant for the Clark County Infirmary were approved upon condition that the filtering material be satisfactory to the Division of Sanitary Engineering and that the plant be installed prior to January 1, 1916. The county commissioners are advised of the necessity for maintaining competent and constant supervision of the sewers and sewage treatment plant.

The Board approved plans for proposed sewerage and a sewage treatment plant for the St. Clair Park Allotment at Cleveland with the provision that the intermittent filters as shown on the plans may be temporarily omitted, but must be installed when deemed necessary by the State Board of Health and that the entire plant shall be abandoned and removed as soon as a connection to a city sewer is available.

Plans for a proposed sewage treatment plant for the Franklin County Infirmary and Tuberculosis Hospital were approved subject to the conditions that the plant be enlarged or otherwise modified when deemed necessary by the State Board of Health, that filtering material be approved by the Division of Sanitary Engineering and that the plant be kept under constant and competent supervision.

The Board approved plans for proposed sewerage for the new Ohio Penitentiary to be constructed in Madison County near London. The main sewer for this institution is to connect to the sewerage system of the city of London and the village is required to install a new sewage treatment plant of a design satisfactory to the State Board of Health for the treatment of the sewage of the village and of the penitentiary.

The Board approved general plans for a proposed system of sanitary sewers and detail plans for a proposed sewage treatment plant for the village of Rittman, Wayne County, upon condition that detail plans of the sewers be submitted and that the village provide by ordinance for the proper regulation and use of sanitary and storm water sewers and for the maintenance of the sewage treatment plant.

Plans for sanitary sewerage and sewage disposal for Upper Arlington, Franklin County, were approved on condition that provisions are made for careful attendance to the maintenance of the proposed sewerage system and equipment for sewerage disposal to prevent the misuse of the sewers and to provide satisfactory operation of the sewage lift and further that no further extensions of the proposed sewerage system shall be made until plans have been submitted to the State Board of Health for approval.

The Board approved plans for storm water sewerage for the village of Utica, Licking County, and advised the village officials of the necessity for providing an adequate system of sanitary sewers and sewage treatment works for the removal and disposal of the sewage from the village. It is provided in this approval that the storm water sewers are not to be used for sewage or other putrescible wastes.

Plans for proposed sanitary sewers for the village of West Carrollton, Montgomery County, were approved with the condition that the council of the village must enact an ordinance regulating the proper use of the sanitary and storm water sewers and provide for the proper care and maintenance of the sewerage system. It is also required that in connection with the intsallation of the proposed sewers, equipment shall be installed to provide for the pumping of the sewage during high stages of the Great Miami River and that plans for such equipment shall be satisfactory to the Division of Sanitary Engineering.

At the request of the council of the village of Chardon, Geauga County, the Board amended its order of September 2, 1913, so as to give an extension of time for the construction of sanitary sewers and sewage treatment plant for that village.

A complaint from the trustees of Portage Township, Summit County, asking for an investigation of the pollution of Shocolog Ditch by sewage and other wastes from the city of Akron was presented and referred to the Division of Sanitary Engineering for investigation and report.

Licenses were granted to the following maternity boarding houses and lying-in hospitals:

Genevieve Kerr Wing, 11502 Detroit Avenue, Cleveland,
Mrs. Lillie C. Greenaway, 612 Gilbert Street, Columbus,
Dr. F. A. S. Kautz, 2145 Harrison Avenue, Cincinnati,
Mary L. Kidd, 578 Miller Avenue, Columbus,
Mrs. Mary E. Thorp, Jason Avenue, Columbus,
Mrs. Ella Hastings, 928 Miller Avenue, Columbus,
Mrs. Matti McCoy Hullinger, 723 Albert Street, Lima,
St. Joseph's Maternity Hospital and Infant Asylum, Tennessee Avenue and Reading Road, Cincinnati.

The next regular meeting of the Board will be held in Columbus June 3d.

The annual conference of boards of health of Northern Ohio will be held at Cedar Point in July in conjunction with the regular monthly meeting.

EDITORIAL SECTION.

Birth and Death Rate Variations.

There has been a marked increase in the population of the world during recent years. This has been plainly due to the fall in the death rate and the consequent lengthening of the average human life. It is estimated that the population of the world is about 1,750,000,000 and that the annual increase in its population is about 12,833,000. The rate of increase in this country in 1910 was 12.7 per 1,000. This is more than double the rate of increase in 1810. The death rate, for example, in the principal civilized countries has fallen from 29.09 per 1,000 for the five year period from 1880 to 1885 to 19.26 per 1,000 for the five year period from 1905 to 1910. When one analyzes the available statistics it is noted that the decline in the death rate has been almost entirely in the age periods under thirty-five. From thirty-five to fifty-five years of age the death rate has remained about stationary and above fifty-five years of age it has increased. It is very evident that the cause of the decline in the death rate has been due to progress in bacteriology, hygiene and sanitary science. For example, the typhoid fever death rate in this country has been reduced from 35.9 per 100,000 in 1910 to 16.5 per 100,000 in 1912. There has also been a decline in the birth rate, particularly among that portion of the population which may be regarded as thrifty. This is true the world over. For example, in France the birth rate has fallen from 23.9 per 1,000 in 1886 to 18.7 per 1,000 in 1911. During the same period the birth rate in Australia fell from 35.4 per 1,000 to 27.2 per 1,000 population. Owing to the inaccurate birth returns in this country, it is impossible to give accurate figures, but it has been estimated after careful investigation that the decline has been practically the same as in France and Australia. It should be mentioned in this connection that economists consider it desirable for a country to have a low death rate and a low birth rate. Such a condition involves a minimum amount of waste of human energy and is really vital economy. Fisher, in this connection, refers to the fact that the female mackerel lays about 50,000 eggs and only two or three on the average live to produce. This is a waste of energy and not economical. The higher the form of animal the less there is of this kind of waste.

Hoffman, writing on this subject, states that it is his belief that the population will increase still more rapidly in the future and that the general death rate will be lowered still further. He directs attention to the importance of conserving the food supply under these circumstances. He makes the statement, which is undoubtedly correct, that the production of cereal crops has increased more rapidly than the population. For example, the world's crop of wheat, rye, barley, corn and oats showed a 45 per cent increase from 1895 to 1912, while the population increase in this period was only 12.6 per cent. Hoffman directs particular attention to the vital importance of conserving the food producing resources of the land and sea. He emphasizes the necessity of studying improved methods of food production in order to prevent waste and also the necessity of education in practical domestic economy. He thinks it is necessary to establish improved methods of general education including adequate systems of medical supervision and physical training of school children. The control of marriage, fecundity, and divorce are essential. Attention is also called to the absolute necessity of improving the administrative control of public health matters and to the establishment of higher educational ideas, as well as the development of the spirit of social service. It is well known that the two greatest basic sources of economic wealth are the human race and the land with its soil, minerals and other resources. One cannot be conserved if at the same time the other is not conserved.

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Death Rates — What Do They Show?

According to the U. S. Bureau of the Census the death rate in the registration area of the United States during 1913 (the last year in which complete statistics are available) was 14.1 per 1,000 estimated population. In 1912 it was 13.9 and in 1911 14.2, and the average from 1906 to 1910 was 15.5 and from 1901 to 1905 was 16.2 per 1,000. During the years 1911, 1912, and 1913 the average was 14.06 per 1,000 estimated population. What does this reduction in the death rate mean in the actual lives saved? The reduction in the death rate from 16.2, the average from 1901 to 1905, to 14.1, the average of 1913, amounts to 13 per cent, or a reduction of one death in every eight. If the same rate had prevailed in 1913, as in the period from 1901 to 1905, there would have been recorded according to Hoffman, at least 1,025,446 deaths instead of 890,823, and in this instance there is a saving of 134,623 lives.

The largest percentage of decrease in deaths in the various states was shown in Rhode Island (15.7%), followed by New York (12.3%), New Jersey (11.2%) and Massachusetts (9.6%). It is probably only a coincidence that all these marked decreases occurred in one section of the country. In certain states increases in the death rate were noted as, for example, Michigan (4.5%), New Hampshire (3%), and Indiana (0.8%) per 1,000 population. It is probable that these increases are due to the more accurate registration of deaths in these states and not an actual increase in rates. The state of Washington had during 1913 the lowest death rate, 8.5 per 1,000, Minnesota had a death rate of 10.4 per 1,000, Utah 11 per 1,000, Wisconsin and Colorado 11.5 per 1,000, and Ohio 13.7 per 1,000 population. It will be noted that the death rate in Ohio for 1913 was somewhat less than the average (14.1 per 1,000). The highest death rates in United States are noted in the following states: New Hampshire (17.1), North Carolina (16.8), Maryland (16.2), Vermont (15.8), Maine (15.3), and Connecticut, Massachusetts, New York and Rhode Island (15.) per 1,000 estimated population.

In the four states in the registration area which have a colored population of over 10 per cent, namely, Kentucky, Maryland, North Carolina, and Virginia, the average death rate is 15.0 per 1,000, while in Wisconsin, Washington, Vermont and Minnesota, which have an equal population to the southern states, above mentioned, but have a very small oclored population, the death rate averages 11.5 per 1,000 population.

Among the cities in United States over 100,000 population, the lowest death rates are noted in Seattle and Spokane, Washington, the death rates being 8.4 per 1,000 in the former and 8.9 per 1,000 in the latter. Portland, Oregon, also had a low death rate of 9.5 per 1,000. The highest death rates in United States in cities of over 100,000 population were as follows: Memphis, Tenn., 20.8 per 1,000; Richmond, Va., 20.4 per 1,000; New Orleans, La., 19.9 per 1,000; Albany, N. Y., 19.8 per 1,000; Baltimore, Md., 18.5 per 1,000; Nashville, Tenn., 17.8 per 1,000; Birmingham, Ala., 17.4 per 1,000; Atlanta, Ga., 17.4 per 1,000; and Washington, D. C., 17.3 per 1,000, estimated population. It can be definitely stated that the low death rate in the Northwest is due to location, climate, age and character of the population, and public interest in hygiene and sanitary science.

* * *

The Decrease in Tuberculosis.

It can be accurately stated, based upon the statistics at hand, that the mortality from tuberculosis of the lungs has been materially decreased in the United States during the last thirty years, and that at least 200,000 lives have been saved in the last ten years. In 1900 the death rate from tuberculosis of the lungs in the United States was 180.5 per 100,000 population. This death rate was reduced to 139.7 per 100,000 population in 1910, and during the last four years, although not so complete statistics are at hand, it would seem to have been lowered still further.

It is interesting that the aggregate mortality from tuberculosis for the ten year period (1900-1910) was, according to Hoffman, about 1,331,000. If the death rate which prevailed in 1900, namely, 180.5 per 100,000 population, had continued during the ten year period following, approximately 200,000 more deaths would have occurred. It is not necessary to emphasize the value of the saving of these lives to the state and the nation. Furthermore, inasmuch as the average age of death from tuberculosis is 36.1 years for both men and women, it will be seen that the 200,000 individuals have been saved during the most productive period of their lives.

It is probable that fully 150,000 people are dying annually in this country from tuberculosis in all its forms. When one appreciates that in addition there are fully 1,500,000 persons suffering from this disease in the United States, the enormity of the problem is at once evident. The statistics for Ohio show about 7,000 deaths annually with about 35,000 estimated cases.

Again, when one considers that tuberculosis is a known preventable disease, and that the community as a whole is accordingly responsible for the preventable sickness and deaths which occur, the necessity of more concentrated and concerted action along preventive lines is emphasized in a very forceful manner.

The question naturally arises as to what causes may be ascribed the marked reduction in the mortality from this disease. A critical survey shows this to be due, without doubt, to the nation-wide preventive campaign against this disease. This campaign has been carried on by voluntary associations in this country for several years. Recently the state governments have taken up the matter. It is hoped that by concentrated work and effort, the death rate from tuberculosis in this state may be reduced to much below the point where it is at the present time, namely, 137.9 per 100,000 population. The reduction in the death rate from this disease has been about the same in Ohio as in the country over.

It is well to appreciate, however, that the reduction in the death rate from tuberculosis in this state, and in this nation, will not be as rapid as it has been during the last few years. This is true of all diseases. The death rate may be rapidly lowered to a certain point, and then progress is extremely slow due to certain obstacles and obstructions which may be regarded as residual. In order to combat successfully this disease in the future, especial attention must be given to the separate treatment of incipient and advanced cases of tuberculosis. The incipient case must be cured, either at home in the fresh air or in a hospital, and the advanced case, which is beyond hope of cure, must be taken out of the community to a hospital for advanced cases so as not to be a focus of infection.

Many other examples may be given of the incidence of other infectious diseases in communities where attention is given to matters of hygiene and sanitation and where such attention is not given. In all instances it is possible to reduce the death rates to a so-called normal. It is presumed that the normal death rate for a particular disease does not indicate the limit of its preventability in any particular community, but indicates the average secured when taking into consideration conditions which obtain the country over and conditions over which the individual members of the community have little control.

* * *

Religion, Ignorance and Health.

The Christian religion is regarded as one of the principal foundation stones of good government, as we all know. Nevertheless, many people use the cloak of religion to cover up many things, both knowingly and unknowingly, and make little or no attempt at the practical application of religious teaching to the affairs of every day life. Religion is a comfort to many people in times of trial, tribulation and distress. It is perhaps well that such is the case. It becomes necessary, however, not to accept dogmatically all ancient day religious teaching but to use knowledge both scientific and general, judgment and discretion in order to arrive at the foundation principles and a correct interpretation of the statements written in ancient biblical literature. The following incident illustrates quite well a common situation:

"We stand in the face of one of the great mysteries of life. A young life given just two years ago has now been taken away. We search for an explanation but find none. We know not the ways of the Lord. We know, however, that it must be for the best although we grieve to the extreme. The Lord giveth and the Lord taketh away," said the minister as the little white casket was lowered into the flower-lined grave in the presence of sorrowing parents and relatives.

The circumstances were these: The child, a two-year-old baby girl, had died from diphtheria. A public funeral had been prohibited by the health department, in accordance with the regulations, much to the dissatisfaction of the parents who seemingly possessed more than ordinary intelligence and standing in the community. The attending physician who saw the child two days before it died stated that when he was called he found the baby completely prostrated, the pulse rapid, the face pale with the slight flush of fever over the upper part of the cheeks, all of which told of the extended invasion of the body with some infecting agent. An examination revealed a distinct membrane in the throat. The doctor took a swab for bacteriological examination which was subsequently confirmed, but stated that without doubt the child had a very malignant case of diphtheria. He advised the immediate use of antitoxin and, notwithstanding the strenuous objection of the father, he gave 5,000 units of antitoxin, which was all he had with him. The parents were individuals who did not believe in the use of drugs or other therapeutic agents in the treatment of diseases. They did not believe in vaccination or the use of antitoxin principally because, as they said, the biological products used were made from animals and that such substances would undoubtedly injure the human body. The doctor stated that if the child was to be saved the dose must be doubled within a few hours. The parents refused to allow the further use of this well-established remedy and gave as their opinion that the child was only suffering from a sore throat which would undoubtedly be relieved by morning. The doctor was dismissed and the father paid him for the services rendered. The baby died the following day, the physician in the meantime having reported the case to the health department which placed an immediate quarantine on the premises. Gross ignorance of the parents was the cause of this death. Is it not sacrilegious to charge the Almighty with responsibility in such a case? The parents were nothing more than plain murderers, perhaps because of ignorance but this constitutes no valid excuse. It can be almost positively stated that if antitoxin had been used early and in large doses the child would have lived. The efficacy of this remedy has been thoroughly established. How often unnecessary deaths occur among infants which may be traced to ignorance, poverty and neglect. Morbidity tables show that 27.53 per cent of all deaths occur under five years of age. There must be some reason!

* * *

The Ohio Registration of Nurses Law.

After a struggle on the part of Ohio nurses covering a period of ten years, there has just been placed upon the statute books a law which takes the state out of the small number of states which have refused hitherto to register nurses.

There was strong opposition to the details of the bill upon the part of a small group of nurses and the legislative history of the bill indicates the difficulties as they arose from time to time. It is as follows:

On February 16, 1915, the bill was introduced in the house of Representatives by Mr. Sprague of Scioto County, and the next day it was referred to the committee on Universities, Colleges and Normal Schools where it was materially amended. On March 29, it was finally reported out of committee with a favorable recommendation for passage. The bill as amended passed the House of Representatives on April 6, by a vote of 79 yeas to 6 nays..

On April 7, the bill was sent to the Senate and there it was referred to the Committee on Public Health, which reported it out without amendment and with a recommendation for passage on April 12. It was placed on the Senate Calendar as a special order on April 15, and when the bill was called up, Senator Myers moved to amend the bill. His motion lost by a vote of yeas 1 to nays 25. Senator McDermott moved to amend the bill materially by providing for a board of five nurses to be appointed by the Governor. His motion carried yeas 17 to nays 4. The bill was then passed by a vote of yeas 25 to nays 3. The amendment offered by Senator McDermott was unconstitutional if applied to women nurses, but constitutional if applied to male nurses. Such a situation was not to the liking of the nurses, nor to any one else.

On April 16, Senator Lloyd moved that the vote by which the bill was passed, be reconsidered and further moved that consideration of the motion be postponed to April 21. Senator McDermott demanded a call of the Senate upon which twenty-three Senators answered to their names. He then moved to table Senator Lloyd's motion which was disagreed to by 17 nays and 7 yeas. Senator Lloyd's motion was then agreed to.

On April 21, Senator Lloyd's motion came up for consideration as a special order. Senator McDermott arose to a point of order, stating that the motion was out of order. The president ruled the point of order not well taken. Upon the roll call, Senator Lloyd's motion to reconsider prevailed by a vote of 25 yeas to 6 nays. Senator Collins moved that the vote by which the amendments offered by Senator McDermott were agreed to, be reconsidered and this motion carried 24 yeas to 7 nays. Senator McDermott moved to again amend the bill and his motion lost 23 nays to 8 yeas. The question as to the passage of the bill was answered in the affirmative yeas 26, nays 6. The title was agreed to.

On May 5, Governor Willis signed the bill.

So much for the steps by which the bill became law. How will the law operate to the benefit of the nursing profession of Ohio and to the general public?

In the first place the law has the sympathetic support of the State Board of Medical Registration and its Secretary, Dr. George Matson. Since the nurses' examining committee is to be under this board, there is every reason to expect that the administration of the law will be of such a character that the views and wishes of the nurses in the state will have great weight in working out the details that will inevitably arise.

In the second place, every other official board and organization in the state interested in public health work is anxious to see the problems connected with this law worked out successfully to the end that a continually higher educational standard may be exacted of women who seek to enter this profession.

The burden of responsibility for the smooth and harmonious operation of this law rests with the nurses themselves. If they do not seriously study the working out of the policies and seek to understand the conditions under which such policies are made the result will be the failure of the law.

PUBLIC HEALTH ACTIVITIES IN OHIO.

Ohio State Public Health Exhibit.

The following itinerary for the Ohio State Public Health Exhibit has been arranged for the ensuing month:

Georgetown	May 11-14
Hillsboro	May 18-21
Wilmington	May 25-28
Greenfield	June 1-3
Waverly	June 8-11

Meetings of county health officials will be held in Georgetown, Hillsboro, Wilmington and Waverly.

Following the close of the campaign in Waverly the Exhibit will be returned to Columbus preparatory to a tour of the State Normal Colleges.

The County Fair itinerary for the Ohio State Public Health Exhibit has been finally settled upon by the Committee on State Exhibits as follows:

Date.	*County.*	*Place.*
Aug. 10	Muskingum	Zanesville.
Aug. 17	Monroe	Woodsfield.
Aug. 24	Athens	Athens.
Aug. 31	State Fair	Columbus.
Sept. 7	Summit	Cuyahoga Falls.
Sept. 14	Columbiana	Lisbon.
Sept. 21	Stark	Canton.
Sept. 28	Tuscarawas	Canal Dover.
Oct. 5	Carroll	Carrollton.

PIQUA PUBLIC SCHOOLS,
Piqua, Ohio.
Geo. C. Dietrich, *Superintendent.*

Piqua, Ohio, April 22nd, 1915.

State Board of Health,
Columbus, Ohio.

Gentlemen: — At a recent meeting a resolution of thanks was passed by the Piqua Public Welfare Association in acknowledgment of the recent visit to our city of your health exhibit. It was the unanimous opinion of the members present at the meeting that the exhibit would result in more attention being paid to matters of health, and that beneficial results will follow for many years. As secretary, I was instructed to write you this note of appreciation.

Very truly yours,
(Signed) G. C. Dietrich.

Public Health Organizations.

The Piqua Welfare Association was organized on March 15th, with Dr. O. L. Utter as Chairman, and Prof. Geo. C. Dietrich as Secretary. Steps are being taken to secure a public health nurse within the near future.

On March 25th, the Civic and Public Health League of Kent was formed with the following officers: president, Mrs. Rebecca M. Evans; vice-president, Mrs. R. J. Davis; treasurer, Mrs. B. G. Kneifel; and secretary, Mrs. E. J. Wilt.

As a result of the work of the state traveling nurse employed by the Ohio Society for the Prevention of Tuberculosis, the Greenville Public Health League was organized on April 1. Sufficient funds have been raised to employ a permanent public health nurse during the coming year.

A Suggestive Program.

Members of the Youngstown Anti-Tuberculosis Society held an enthusiastic meeting recently and discussed plans for a renewed fight against the white plague.

A campaign of education and sanitation will be waged in an attempt to wipe out the disease. Lectures will be given at several places in the city and there is a possibility of motion pictures taking a prominent part in the fight. Films, supplied by the National Society will be sent here, if the plans of the Society are carried out. Lecturers secured from the ranks of local physicians and laymen interested in the work will talk on the subject.

Miss Carlin of the Youngstown hospital is appointed to look after the housing conditions of people believed to be tubercular and she will act in conjunction with the committee appointed for such a purpose by the Central Council of Social Agencies.

Workers to Meet.

Meetings for workers in mills and shops are being planned and physicians at the different plants will be asked to deliver the talks. Department store exhibits and lectures will also be taken up as well as the talks to school children in all parts of Youngstown.

President of the society, Dr. H. E. Welch will make application for the state tuberculosis exhibit.

A committee, to be appointed by the president, will ask the board of education to hold fresh air classes for the school children and literature, sent to the local health board, will be distributed by the society at the various meetings.

In connection with the clean-up weeek here, a health survey is planned and members say that a state inspector will be secured to look after this part of the work.

"Tuberculosis Day."

The police will be requested to enforce the spitting ordinance in streets and the street railway people to see that it is carried out on the cars.

The question of observing "Tuberculosis Day" will be in the hands of the new committee and an attempt made to have the day mentioned in all the churches of the city.

The committee will also investigate the advisability of securing the services of a field worker whose duty it will be to look up new cases and see that proper care is given them.

The society will ask that the medical society appoint a committee of physicians to help in the work and act as an executive committee. President Welch will bring this before the medical men at their next meeting.

Public Health Nurses.

On May 1st, the London Public Health and Welfare League employed Miss Mabel C. Smith as permanent public health nurse.

Miss Alta C. Barnes, who has been employed by the Ohio Society as a traveling public health nurse, was sent to Salem on May 3, where she will be employed by the Public Health League as a permanent public health nurse.

Miss Elizabeth Davison, State traveling nurse, for the Ohio Society, completed her month's work in Greenville on April 5th. She then spent a week in Troy where she was successful in aiding a local committee to secure an appropriation from the city council for the employment of a permanent public health nurse. On April 22d, she began a month's work in Tiffin.

Miss M. J. Macdonald was employed on April 1st by the Health Committee of the Marion Federation of Women's Clubs to succeed Miss May Campbell, resigned.

Tuberculosis Hospitals.

DISTRICT NO. 10.

At a meeting held in Chillicothe on April 22d, the County Commissioners of Ross, Fayette, and Pike Counties, informally agreed to a proposition to form a district to erect and maintain a district tuberculosis hospital. It is hoped to secure the consent of the boards of commissioners of Scioto and Pickaway Counties to join in the district. In this event, it is proposed to provide the sum of $25,000.00 by a tax levy of 1/10 of one mill. The commissioners of Scioto County gave their assent to this proposal on May 3d, and the commissioners of Pickaway County refused to join in the proposed district, on May 10th. A meeting of the commissioners from the four counties which are in agreement will be held in Chillicothe on May 13th, to discuss the proposition further.

Conference of Tuberculosis Hospital Superintendents.

The fourth conference of Ohio Tuberculosis Hospital Superintendents will be held at the Lucas County Tuberculosis Hospital on Friday, May 28th, at 1:00 P. M. Reports of committees and an inspection of the hospital will constitute the business before this session of the conference.

Health Day.

Health day was observed for the fifth year in the schools of the city, Friday. At the High school the exercises were in the morning. In the grades they were at two o'clock in the afternoon. The list of speakers for the various buildings was given on Thursday.

Every pupil in parochial and public schools was given a blotter on which, in bright red ink were printed various crisp sentences about cleanliness, civic beauty and health. In many of the lower grades the children learned and recited little verses especially composed for the occasion by members of the Century Club, which was the originator of the health day idea and under the auspices of which it is always held. — Chillicothe, O., *Advertiser*, April 16, 1915.

Test Supports Ruling.

Effectiveness of a ruling made by the state board of administration not long ago, that no contracts for milk supply shall be made for any state institution with a dairyman whose cows have not been tuberculin-tested, has just been shown through an investigation made by the veterinary department of the state agricultural commission.

A new contract to supply a state hospital with milk was made the first of the month. The dairy concern which previously had had the contract with the hospital sought a renewal of its contract, but this was turned down because the cows of the dairy had not been given the tuberculin test.

Since the letting of a new contract, Dr. G. M. Pierce, one of the agricultural department's field veterinarians, made a test of the old contractor's herd of cows from which the hospital's milk supply had come. Dr. Pierce is said to have found that 40 cows in the herd were tubercular. — Columbus, *Ohio State Journal*, April 20, 1915.

Open Fight on Infant Mortality.

Mr. Frank L. Brown, statistical expert of the children's bureau of the United States department of labor, is in Akron arranging for the organization of the work here against infant mortality. Local headquarters have been established at 511 Second National Bank building.

Last year one out of every eight babies born in the United States died before reaching the age of one year, according to Mr. Brown. Of all the funerals in America, one in every five is that of a child less than one year old.

Women experts employed by the government will copy from the records the names and addresses of all children born in Akron during the past year or so, in order to locate mothers of infants. All information given the agents of the Children's Bureau will be held strictly confidential. The government only desires the facts, without any tinge of personality.

The social, industrial, and economic conditions surrounding the children born within the year will be studied in an effort to trace every child so born, either through that year, or as much of that year as he survives. Every mother of children born during the period from July 1, 1913, to July 1, 1914, will be asked to furnish the government with such information as will be of assistance to other mothers and to the government in the efforts to save babies' lives.

All of the mothers in Akron should clearly understand that the government does not desire to intrude upon the privacy of family life, but that it asks their co-operation in this grand effort to safeguard the lives of babies.

Already the cities of Johnstown, Pa., Manchester, N. H., Brocton and New Bedford, Mass.; and Saginaw, Mich., have been studied and the agents of the Children's Bureau have found everywhere a cordial reception.

The government wishes to assist in the efforts of the community to reduce the large number of infant deaths, for it is a fact that the conditions which destroy so many of the youngest lives of the community also result in crippling and maiming many others, and must react unfavorably upon the health of the entire community.—Akron *Times,* April 3, 1915.

Legislation.

Bills of interest to the public health and social worker which have been introduced in the Eighty-first General Assembly of Ohio up to May 8, are as follows:

SENATE.

S. B. No. 7—Mr. Lloyd, Franklin Co., Jan. 18. **Providing for the regulation and licensing of the loaning of money without security or upon personal property.**

Jan. 19—Judiciary com. Mar. 24—Substitute bill recommended. Mar. 25—Passed; yeas 30, nays 0. Mar. 29—House banks com. Apr. 12—Recommended amended. Apr. 21—Amended. Apr. 21—Passed House; yeas 91, nays 1.

S. B. No. 9—Mr. Carson, Muskingum Co., Jan. 18. **Relative to changes of water supply for cities and villages.**

Jan. 19—Public health com. Feb. 3—Indefinitely postponed.

S. B. No. 16—Mr. Archer, Noble Co., Jan. 18. **Relative to obtaining marriage licenses.**

Jan. 28—Lost; yeas 13, nays 15.

S. B. No. 23—Mr. Cass, Putnam Co., Jan. 19. **Providing for the appointment of a juvenile and humane officer by common pleas or probate courts of county.**

Jan. 20—Judiciary com.

S. B. No. 29—Mr. Stone, Lorain Co., Jan. 20. **Relating to guardianship and control of inmates of children's homes.**

Jan. 21—Benevolent institutions com. Apr. 29—Indefinitely postponed.

S. B. No. 54—Mr. Mooney, Cuyahoga Co., Feb. 1. **Providing that applicants for certificates as pharmacist shall have at least two years in approved schools.**

Feb. 2—Medical colleges com.

S. B. No. 55—Mr. Kennedy, Cuyahoga Co., Feb. 1. **Appropriating $5,000 for extension of state free employment agencies.**

Feb. 2—Finance com. Feb. 4—Recommended. Feb. 9—Recommitted finance com.

S. B. No. 58—Mr. Mooney, Cuyahoga Co., Feb. 2. **Legalizing practice of Christian Science.**

Feb. 3—Public health com.

S. B. No. 60—Mr. Bauer, Hamilton Co., Feb. 2. Defining delinquent and dependent child.

Feb. 3—Benevolent institutions com. Mar. 4—Recommended amended. Mar. 9—Passed; yeas 23, nays 0. Mar. 10—House judiciary com. Apr. 16—Recommended.

S. B. No. 64—Mr. Behne, Williams Co., Feb. 3. To give State Board of Health supervision over public vaults and mausoleums.

Feb. 4—Public health com.

S. B. No. 71—Mr. Archer, Noble Co., Feb. 8. Providing for the registration of bottles, siphons, siphon tops, fountain tanks, kegs, or other containers; and making it unlawful for any person, other than the owner thereof, to fill, refill, deal or traffic in such bottles and other containers.

Feb. 18—Passed; yeas 23, nays 2. Feb. 24—House public health com. Mar. 4—Recommended. Mar. 11—Passed House; yeas 89, nays 8. Approved by Governor.

S. B. No. 73—Mr. Mooney, Cuyahoga Co., Feb. 8. Relating to the board of state charities, the juvenile court and county children's homes.

Feb. 9—Benevolent institutions com. Mar. 11—Recommended amended. Mar. 17—Amended. Mar. 17—Lost; yeas 12, nays 17. Mar. 18—Reconsidered; special order Mar. 23, 3 P. M. Mar. 23—Passed; yeas 22, nays 7. Mar. 26—House penal institutions com. Apr. 5—Recommended. Apr. 22—Lost; yeas 50, nays 26.

S. B. No. 75—Mr. Wickline, Summit Co., Feb. 8. To provide for the further regulations of embalming and the preparation and disposal of the dead.

Feb. 9—Public health com.

S. B. No. 84—Mr. Lloyd, Franklin Co., Feb. 9. Relating to the practice of dentistry.

Feb. 10—Public health com. Feb. 25—Recommended amended. Mar. 2—Amended. Mar. 2—Passed; yeas 29, nays 0. Mar. 4—House public health com. Mar. 18—Recommended. Apr. 22—Passed; yeas 92, nays 0.

S. B. No. 103—Mr. Vorhies, Guernsey Co., Feb. 12. Requiring Physicians to report prevalence of certain diseases to state board of health.

Feb. 15—Public health com. Mar. 18—Passed; yeas 18, nays 5. Mar. 26—Public health com. House. Apr. 7—Recommended.

S. B. No. 131—Mr. Lloyd, Franklin Co., Feb., 24. Relating to the registration of pharmacists.

Feb. 25—Public health com. Apr. 27—Recommended amended. May 6—Amended. May 6—Lost; yeas 14, nays 15.

S. B. No. 185—Mr. Kennedy, Cuyahoga Co., Mar. 11. Relative to selling, exchanging or incumbering real estate held by charitable or religious societies or associations.

Mar. 12—Benevolent institutions com.

S. B. No. 194—Mr. Archer, Noble Co., Mar. 12. Giving industrial commission power to fix hours of employment and periods of rest for employes.

Mar. 30—Passed; yeas 18, nays 15. Apr. 5—House public utilities com. Apr. 21—Recommended amended. Apr. 29—Amended. Apr. 29—Recommitted house labor com. May 6—Reconsidered. May 6—Lost; yeas 61, nays 47.

S. B. No. 198—Mr. Wickline, Summit Co., Mar. 15. To provide for further regulation of embalming.

Apr. 12—Passed; yeas 29, nays 1. Apr. 15—House judiciary com. Apr. 29—Recommended amended.

S. B. No. 202—Mr. Gilmore, Preble Co., Mar. 16. Relating to the expenses of officers and employes of county children's homes.

Mar. 30—Passed; yeas 26, nays 0. Apr. 5—House judiciary com.

S. B. No. 219—Mr. Myers, Marion Co., Mar. 23—Providing for the filing by children of work certificates.

Mar. 24—Public education com.

S. B. No. 221—Mr. Myers, Marion Co., Mar. 23—Relating to penalty for hours of labor for minors.

Mar. 24—Public education com.

S. B. No. 222—Mr. Lynch, Lucas Co., Mar. 23. Restricting the selling, giving away of cocaine, opium, morphine and other drugs.

Apr. 1—Passed; yeas 27, nays 4. Apr. 7—House judiciary com. Apr. 16—Recommended amended.

S. B. No. 224—Mr. Myers, Marion Co., Mar. 23. Relating to child labor.

Mar. 24—Public education com.

S. B. No. 235—Mr. Collins, Hamilton Co., Mar. 25. To provide for a survey, examination and report upon waterways of the state by special board.

Mar. 26—Public works com.

S. B. No. 242—Mr. McDermott, Trumbull Co., Mar. 29. To provide for pensions for sanitary police in municipal corporations.

Apr. 12—Passed; yeas 26, nays 0.

S. B. No. 254—Mr. Beckett, Pickaway Co., Mar. 31. Providing for an institution for deformed and crippled children.

Apr. 1—Benevolent institutions com. Apr. 6—Finance com.

S. B. No. 272—Mr. Vorhies, Guernsey Co., Apr. 12. To regulate private employment agencies.

Apr. 22—Passed; yeas 28, nays 0. Apr. 28—House judiciary com.

S. B. No. 280—Mr. Stone, Lorain Co., Apr. 13. Providing that public schools shall be free to inmates of private orphan asylums and children's homes.

Apr. 13—Benevolent institutions com. Apr. 14—Recommended. Apr. 27—Passed; yeas 27, nays 0. Apr. 29—House common schools com. May 6—Recommended.

S. B. No. 284—Mr. Kennedy, Cuyahoga Co., Apr. 14. Relating to the hours of labor and provision for women.

Apr. 15—Labor com. Apr. 27—Recommended amended. Apr. 29—Recommitted labor com.

S. B. No. 301—Mr. Kennedy, Cuyahoga Co., Apr. 29—Amending the building code.

May 4—Public health com.

S. B. No. 303—Mr. McDermott, Trumbull Co., Apr. 29. Providing a pension fund for nurses of state hospitals.

Apr. 29—County affairs com. Apr. 29—Recommended.

May 5—Passed; yeas 20, nays 0. May 7—House public health com.

HOUSE.

H. B. No. 14—Mr. Young, Cuyahoga Co., Jan. 19. Relative to the employment of females and regulating their hours of employment.

Jan. 20—Labor com.

H. B. No. 17—Mr. Bohm, Cuyahoga Co., Jan. 19. Giving one rest day a week to employes in certain trades.

Jan. 20—Labor com. Mar. 18—Recommended amended.

H. B. No. 61—Mr. Deaton, Miami Co., Jan. 19. Permitting probate court to issue marriage license to persons under legal age who have no guardian.

Jan. 20—Codes, courts and procedure com. Feb. 1—Recommended amended. Feb. 3—Amended. Feb. 3—Passed; yeas 96, nays 5. Feb. 8—Senate Judiciary com. Feb. 24—Without recommendation. Feb. 25—Passed; yeas 17, nays 7. Approved by Governor.

H. B. No. 64—Mr. Deaton, Miami Co., Jan. 19. To place bureau of vital statistics under state board of health.

Jan. 20—Public health com. Feb. 11—Recommended amended. Feb. 18—Lost; nays 79, yeas 24.

H. B. No. 94—Mr. Walsh, Cuyahoga Co., Jan. 19. To provide for admission of feeble-minded youths to state institutions.

Jan. 27—Passed; yeas 107, nays 0. Feb. 1—Senate benevolent institution com. Feb. 2—Recommended. Feb. 4—Passed Senate; yeas 26, nays 0. Approved by Governor.

H. B. No. 98—Mr. Young, Cuyahoga Co., Jan. 20. To indemnify persons unjustly imprisoned by the state.

Jan. 21—Benevolent and penal institutions com.

H. B. No. 103—Mr. Garver, Holmes Co., Jan. 20. Providing payment of fees in prosecutions for bastardy.

Jan. 21—Judiciary com. Mar. 19—Recommended amended.

H. B. No. 104—Mr. Cromley, Knox Co., Jan. 20. To repeal indeterminate sentence law.

Jan. 21—Codes, courts and procedure com. Feb. 3—Reported without recommendation. Feb. 9—Lost; yeas 40, nays 65. Feb. 18—Reconsidered and passed; yeas 71, nays 41. Feb. 19—Senate judiciary com.

H. B. No. 121—Mr. Hoy, Jackson Co., Jan. 21. Authorizing the state board of health to produce free diphtheria antitoxin.

Jan. 25—Public health com. Jan. 28—Recommended. Feb. 2—Passed; yeas 106, nays 1. Feb. 3—Senate public health com. Feb. 11—Recommended. Feb. 18—Passed; yeas 27, nays 0. Approved by Governor.

H. B. No. 132—Mr. Platt, Ashtabula Co., Jan. 25. To transfer from agricultural commission to state board of pharmacy the power of enforcing regulation of sale of drugs.

Jan. 26—Agriculture com. March 15—Recommended amended. April 7—Recommitted agriculture com. April 16—Recommended. May 6—Amended. May 6—Passed; yeas 88, nays 1. May 7—Passed Senate; yeas 20; nays 0.

H. B. No. 135—Mr. Morris, Fairfield Co., Jan. 25. Exempting school buildings of one room from provisions of law on fire exits.

Jan. 26—Common schools com. Feb. 12—Recommended. Feb. 24—Recommitted to public building and land com. April 15—Recommended. April 21—Amended. April 21—Passed; yeas 73, nays 0. April 27—Senate public education com.

H. B. No. 138—Mr. Jones, Franklin Co., Jan. 25. To provide for prosecution of suit over possession of a child.

Jan. 26—Judiciary com. Feb. 10—Recommended amended. Feb. 17—Lost; yeas 50, nays 53.

H. B. No. 140—Mr. Jones, Franklin Co., Jan. 25. To provide for adoption of minor child by an unmarried person or husband and wife.

Jan. 26—Codes, courts and procedure com.

H. B. No. 142—Mr .Hoy, Jackson Co., Jan. 25. To bar undesirables from the practice of medicine.

Feb. 19—Passed; yeas 71, nays 13. March 9—Senate medical colleges com. March 26—Recommended amended. April 1—Passed; yeas 19, nays 6. Approved by Governor.

H. B. No. 150—Mr. Black, Wyandotte Co., Jan. 25. Transferring control of the woman's reformatory at Marysville from the building commission to the state board of administration.

Jan. 26—Benevolent and penal institutions com. Feb. 12—Recommended amended. Feb. 24—Passed; yeas 95, nays 0. Feb. 26—Senate benevolent institutions com. March 24—Recommended. Passed; yeas 30, nays 0. Approved by Governor.

H. B. No. 154—Mr. Morris, Fairfield Co., Jan. 26—Providing new conditions for entrance to Mt. Vernon tuberculosis sanatorium.

Jan. 28—Public health com. Feb. 19—Recommended amended. Feb. 25—Passed; yeas 91, nays 0. March 1—Senate judiciary com. March 11—Recommended. March 26—Recommitted Senate judiciary com.

H. B. No. 156—Mr. Ott, Hamilton Co., Jan. 26. Providing that street car men shall have 13 hours rest out of every 24 hours.

Jan. 28—Labor com. March 4—Recommended amended. March 24—Amended. March 24—Recommitted labor com. March 30—Passed; yeas 64, nays 31. April 1—Senate labor com. April 8—Recommended. April 13—Passed; Passed Senate; yeas 18, nays 14. April 21—Reconsidered. April 21—Lost Senate; yeas 15, nays 16.

H. B. No. 175—Mr. Bohn, Cuyahoga Co., Feb. 1. Empowering State Industrial Commission to license all private employment agencies and regulate their activities.

Feb. 3—Labor com.

H. B. No. 177—Mr. Terrell, Cuyahoga Co., Feb. 1. To permit Christian Science healers to practice and collect fees.

Feb. 3—Codes, courts and procedure com.

H. B. No. 190—Mr. King, Hocking Co., Feb. 1. To legalize agreements between employer and employe and limit injunctions.

Feb. 3—Labor com.

H. B. No. 203—Mr. Chapman, Montgomery Co., Feb. 1. Providing county commissioners may maintain comfort stations on county property.

Feb. 3—County affairs com. March 12—Recommended. March 30—Lost; yeas 58, nays 37. April 27—Reconsidered, amended and passed; yeas 84, nays 3. April 29—Senate county affairs com. May 6—Recommended.

H. B. No. 218—Mr. Whitacre, Columbiana Co., Feb. 1. Appropriates $5,000 for extending system of free employment agencies.

Feb. 1—Appropriation com. Feb. 3—Recommended. Feb. 9—Passed; yeas 101, nays 0. Feb. 17—Passed Senate; yeas 24, nays 0. Approved by Governor.

H. B. No. 220—Mr. Platt, Ashtabula Co., Feb. 3—To authorize and regulate the practice of chiropractic.

Feb. 8—Public health com. March 26—Recommended amended. April 6—Passed; yeas 104, nays 0. April 7—Senate public health com. Passed; yeas 21, nays 11. Approved by Governor.

H. B. No. 227—Mr. Hunter, Franklin Co., Feb. 3. To provide for a survey, examination and report upon waterways of the state of special board.

Feb. 8—Public works com. April 9—Without recommendation.

H. B. No. 231—Mr. Powell, Gallia Co., Feb. 3. Prohibiting the contamination of streams and other water courses and bodies of water by the discharge of wastes from manufacturing, rectifying or other plants.

Feb. 8—Public health com. April 20—Recommended.

H. B. No. 244—Mr. Nieding, Lorain Co., Feb. 3—To create a department of public health and medical registration.

Feb. 8—Public health com.

H. B. No. 249—Mr. Cowan, Putnam Co., Feb. 3. Relating to the admission of persons to state institutions.

Feb. 25—Passed; yeas 94, nays 0. March 1—Senate prisons com. March 17—Recommended. March 23—Passed Senate; yeas 23, nays 0. Approved by Governor.

H. B. No. 250—Mr. Oberlin, Stark Co., Feb. 3. Providing for the committment of inebriates, dipsomaniacs, or persons addicted to the habitual use of drugs to hospital for the insane.

Feb. 8—Public health com. March 4—Recommended amended. March 24—Amended. March 24—Passed; yeas 76, nays 16. March 26—Senate judiciary com. April 29—Without recommendation. May 5—Recommitted Senate judiciary com.

H. B. No. 269—Mr. Fox, Lucas Co., Feb. 8. To provide for the extension of sewer districts outside of municipalities.

Feb. 10—County affairs com. March 10—Recommended amended. March 30—Passed; yeas 88, nays 3. March 31—Senate county affairs com. April 27—Recommended. May 4—Passed Senate; yeas 21, nays 2.

H. B. No. 270—Mr. Hoy, Jackson Co., Feb. 10. Relating to custody of minor children.

Feb. 11—Codes, courts and procedure com.

H. B. No. 277—Mr. Hyle, Cuyahoga Co., Feb. 11. Relative to Ohio State building code.

Feb. 15—Public buildings and lands com.

H. B. No. 279—Mr. Hyle, Cuyahoga Co., Feb. 11. To provide for the support of persons who have become permanently incapacitated for work by reason of physical or mental infirmity or by reason of having attained an age in excess of 65 years.

Feb. 15—Codes, courts and procedure com.

H. B. No. 280—Mr. Fitzsimmons, Cuyahoga Co., Feb. 11. To provide for the proper cleaning of all railroad or railway passenger cars or coaches operated within the State of Ohio.

Feb. 15—Public health com. March 4—Indefinitely postponed.

H. B. No. 292—Mr. Jones, Franklin Co., Feb. 11. To prevent minors from becoming vagrants.

Feb. 15—Judiciary com.

H. B. No. 301—Mr. Beitler, Hancock Co., Feb. 15. Relating to the labeling and care of poisonous substances.

Feb. 16—Public health com.

H. B. No. 302—Mr. Palmer, Henry Co., Feb. 15. To prohibit the sale of soda water, soft drinks or other beverages to which has been added morphine, caffeine, cocaine or strychnine.

Feb. 16—Public health com.

H. B. No. 305—Mr. Hoy, Jackson Co., Feb. 15. To regulate the sale, distribution, giving away of opium, and to regulate the treatment and to provide for the committal of the habitual users of such drugs.

Feb. 16—Public health com.

H. B. No. 311—Mr. Cowan, Putnam Co., Feb. 15. To prevent the procreation of defectives and to provide for operation for the prevention of procreation.

Feb. 16—Public health com.

H. B. No. 318—Mr. Hulswitt, Hamilton Co., Feb. 16. Relating to lunatics, idiots and imbeciles.

Feb. 17—Codes, courts and procedure com. March 4—Recommended. March 30—Passed; yeas 90, nays 0. March 31—Senate benevolent institutions com. April 27—Recommended. May 4—Lost; yeas 4, nays 15.

H. B. No. 321—Mr. Beetham, Harrison Co., Feb. 16. Making it unlawful for any person to falsely represent himself or herself as blind, deaf, dumb, crippled.

Feb. 17—Judiciary com. March 4—Recommended. March 24—Passed; yeas 81, nays 11. March 25—Senate judiciary com. April 20—Recommended. April 27—Passed Senate; yeas 19, nays 3. Approved by Governor.

H. B. No. 323—Mr. Sprague, Scioto Co., Feb. 16. To regulate the practice of nursing.

Feb. 17—Universities and colleges com. Mar. 29—Recommended amended. April 6—Amended. April 6—Passed; yeas 79, nays 6. April 15—Passed Senate; yeas 25, nays 3. April 21—Reconsidered. April 21—Passed Senate; yeas 26, nays 6. Approved by Governor.

H. B. No. 351—Mr. White, Columbiana Co., Feb. 26. Placing control of maternity hospitals and boarding houses for infants under board of state charities.

March 1—Benevolent and penal institutions com. March 18—Recommended amended. April 8—Amended. April 8—Lost; yeas 11, nays 61.

H. B. No. 360—Mr. Hoy, Jackson Co., Feb. 26. Providing additional allowances for surgical attendance in industrial accidents.

March 1—Public health com. May 4—Recommended.

H. B. No. 376—Mr. White, Columbiana Co., March 1. To provide for the control of the educational requirements and registration of pharmacists.

March 4—Universities, colleges and normal schools com. March 29—Recommended amended. April 27—Passed; yeas 77, nays 3. April 29—Senate health com. April 29—Recommended. May 6—Amended. May 6—Passed Senate; yeas 23, nays 0.

H. B. No. 380—Mr. Young, Cuyahoga Co., March 1. To enjoin and abate houses of prostitution.

March 4—Public health com.

H. B. No. 384—Mr. Ott, Hamilton Co., March 1. Relating to the the inspection of plumbing.

March 4—Public health com.

H. B. No. 390—Mr. Hoy, Jackson Co., March 1. To regulate the sale or the disposition, in any manner, of opium or coca leaves.

March 1—Public health com.

H. B. No. 392—Mr. Cromley, Knox Co., March 1. Relating to the definition of "Imbecile".

March 4—Codes, courts and procedure com.

H. B. No. 393—Mr. Nieding, Lorain Co., March 1. To legalize the sale of drugs in stores other than drug stores.

March 4—Public health com. April 7—Reconsidered. April 7—Amended. April 7—Lost; yeas 51, nays 5.

H. B. No. 395—Mr. Snyder, Pickaway Co., March 1. Relating to the control of municipal hospitals.

March 4—Judiciary com. March 18—Recommended amended. April 13—Passed; yeas 68, nays 27. April 15—Senate municipal affairs committee.

H. B. No. 397—Mr. Knox, Washington Co., March 1. To provide for the examination and admission to practice of naturopathic physicians.

March 4—Public health com.

H. B. No. 425—Mr. Beitler, Hancock Co., March 4. Relative to admission of non-residents to state benevolent institutions.

March 8—Benevolent and penal institutions com. April 5—Recommended.

H. B. No. 433—Mr. Shank, Medina Co., March 4. Relating to the admission of children to children's homes.

March 8—County affairs com.

H. B. No. 435—Mr. Haines, Tuscarawas Co., March 4. To regulate and control the delivery to hospitals of persons seriously sick or injured.

March 8—Public health com.

H. B. No. 438—Mr. Platt, Ashtabula Co., March 4. Relating to the state building code.

March 8—Public buildings com. March 12—Recommended. April 1—Passed; yeas 81, nays 0. April 6—Senate education com. April 7—Recommended. April 8—Amended. April 8—Passed Senate; yeas 25, nays 0. Vetoed by Governor.

H. B. No. 456—Mr. Chester, Paulding Co., March 9. To provide for the control and management of the public parks of the state.

March 10—Agriculture com. March 22—Recommended amended. April 21—Passed; yeas 81, nays 6. April 22—Senate public works com. April 27—Recommended amended. May 4—Amended. May 4—Passed Senate; yeas 23, nays 1.

H. B. No. 470—Mr. Deaton, Miami Co., March 10. For the prevention of blindness from inflammation of the eyes of the new born.

March 12—Public health com. March 26—Recommended. April 15—Passed; yeas 66, nays 0. April 20—Senate public health com. April 28—Recommended. May 5—Amended. May 5—Passed Senate; yeas 19, nays 0.

H. B. No. 477—Mr. Hasselman, Cuyahoga Co., March 11. Relative to sale of real estate held by charitable or religious societies.

March 12—Economic betterment com. March 18—Recommended. April 14—Passed; yeas 69, nays 16. April 19—Senate benevolent institutions com. April 29—Passed; yeas 22, nays 0.

H. B. No. 484—Mr. Fleming, Mahoning Co., March 12. Permitting child finishing eighth grade to work regardless of age.

March 15—Labor com.

H. B. No. 495—Mr. Oberlin, Stark Co., March 15. Providing for an institution for deformed and crippled children.

March 19—Public health com. April 7—Finance com.

H. B. No. 496—Mr. Clark, March 15. To provide for educational requirements and registration of pharmacists.

March 19—College com.

H. B. No. 511—Mr. Etling, Wayne Co., March 18. Changing registration of pharmacists.

March 19—Colleges com. April 29—Recommended amended.

H. B. No. 517—Mr. Waggoner, March 18. Authorizing insurance companies to insure lives of children between the ages of 5 and 15 for not more than $100.

Mar. 19—Insurance com. Apr. 15—Recommended.

H. B. No. 543—Mr. Fox, Lucas Co., Mar. 23. To permit the practice of Christian Science.

Mar. 26—Judiciary com.

H. B. No. 559—Mr. Snyder, Pickaway Co., Mar. 25. Relating to duty of husband and wife to support their minor children.

Mar. 26—Judiciary com. Apr. 16—Without Recommendation.

H. B. No. 562—Mr. White, Columbiana Co., Mar. 25. Relative to the appointment and duties of library organizer.

Mar. 26—Libraries com. Apr. 21—Recommended.

H. B. No. 627—Mr. Klein, Apr. 9. Substitute for bill vetoed by governor providing for permitting prisoners to be given benefit of conference with attorneys.

Apr. 21—Passed; yeas 85, nays 0. Apr. 27—Passed Senate; yeas 22, nays 0.

H. B. No. 635—Mr. Whitacre, Columbiana Co., Apr. 13. To promote the public health and general welfare by providing for one day of rest in seven for employes in certain employments.

Apr. 15—Public utilities com. Apr. 28—Recommended. Apr. 29—Recommended amended.

H. B. No. 644—Mr. Briggs, Cuyahoga Co., Apr. 16. Relating to the establishment of schools for the education of mentally defective children.

Apr. 19—Universities com.

H. B. No. 660—Mr. Harding, Hamilton Co., Apr. 19. To provide for a city planning commission in municipalities.

Apr. 22—Cities com.

H. B. No. 662—Mr. Hines, Tuscarawas Co., Apr. 19. To provide for the furnishing of certain free text-books to the pupils in the elementary grades in the public schools of Ohio.

Apr. 22—Schools com.

H. B. No. 663—Mr. Heinselman, Mahoning Co., Apr. 19. Relating to the employment of persons working in compressed air.

Apr. 22—Public health com.

H. B. No. 665—Mr. Swan, Preble Co., Apr. 20. Relating to tuberculosis hospitals.

Apr. 20—County Affairs com. Apr. 28—Recommended. May 4—Amended. May 4—Passed; yeas 84, nays 4. May 6—Senate county affairs com. May 7—Recommended.

H. B. No. 670—Mr. Briggs, Cuyahoga Co., Apr. 22. Repealing the present state building code and enacting a new code.

Apr. 26—Public buildings com.

H. B. No. 685—Mr. Briggs, Cuyahoga Co., Apr. 26—Providing for a committee to make a survey to determine the need and extent of a state building code.

Apr. 28—Public building com. May 4—Recommended.

H. B. No. 686—Mr. Briggs, Cuyahoga Co., (by request) Apr. 26. To amend the state building code relating to sanitation.

Apr. 28—Public buildings com.

CURRENT COMMENT ON MATTERS OF PUBLIC HEALTH AND SANITATION.

Statistics of Water Purification Plants.

Abstract of a Report of a Committee of the New England Water Works Association.

In the September, 1914, number of The Journal of New England Water Works Association, there appears a report of a committee on statistics of water purification plants. This committee is composed of Messrs. George C. Whipple, Robert Spurr Weston, F. D. West, Frank W. Green and E. E. Lockridge. This committee realizes that the information obtainable at the various water purification plants in the United States is not comparative and that standardization of report forms would be very advantageous in order to secure definite data regarding the purification of water. The committee divided its studies into five main divisions. Descriptive data; statistics of analysis; engineering statistics; financial statistics; and vital statistics. Under descriptive data twenty-one points are outlined in order to secure a uniform description of water purification plants.

Under statistics of analysis seven types of tables are presented. All persons interested in the operation of water purification plants and all operators in charge of water purification plants should secure a copy of the report of the committee and study carefully the tables therein presented. Much unnecessary analytical work is carried on in a large number of water purification plants and it is probable that after a careful study of the report many time-consuming determinations can be eliminated.

One of the important points in connection with the reporting of operating results is the statement as to the frequency of collecting samples. The question is, "How often must samples be taken in order to obtain reliable results?" In general it may be stated that the frequency of sampling should depend upon the frequency of change in the water examined. For a water of constant quality a few samples taken at infrequent intervals may serve to give a fair idea of the water. If the water, however, is subject to great fluctuations more frequent sampling would be necessary in order to give proper information concerning the character of the water. The reliability of the average result will be determined by the laws of probability. The average result does not tell the whole story, for it eliminates the individual results and the water supply should be safe and wholesome all the time.

It is realized that there is a limitation on the frequency of sampling controlled by practical and financial considerations. It is recognized, however, that results based on infrequent samples are less valuable than those based on frequent samples and that irregular sampling gives the most unreliable results. Based, therefore, upon the character of the records kept, including the frequency of sampling, the committee has classified water purification plants into three grades.

1st Grade: Water purification plants under first grade supervision are those where analyses of the filtered water are made one or more times a day, and where engineering, and such other data regarding the operation of the plant as are necessary are collected by one or more attendants constantly employed.

2d Grade: Water purification plants under second grade supervision are those where analyses are made irregularly, say once a week, or once a month by a trained analyst and where an attendant constantly on duty makes simple daily tests.

3d Grade: Filter plants under third grade supervision are those where analyses are made irregularly and infrequently and where no daily tests are made by the attendant.

The terms used in the reporting of operating results are new and need explanation. A period of 24 hours, or a day, is taken as a unit in determining the efficiency of a water purification plant. If several tests are made in a single day, the results should be averaged, giving one result for the day. This day is known as a "test day", and should analyses be run every day during the week, each week would have seven test days. If analyses are run but one day during the week, there would be but one test day in that week.

For the purpose of uniform tabulation calendar months and calendar years should be used. Each month's average, or mean, should be obtained by dividing the sum of the daily results by the number of test days during that month. The yearly average, or mean, should be obtained by dividing the sum of the daily results by the number of test days during the year. Owing to the fact that frequently in second and third grade plants particularly, the number of analyses during certain months is greatly in excess of those obtained in other months, the method mentioned above is an unfair average result. The committee, therefore, recommends that the annual average be secured by obtaining the mean of the twelve monthly averages.

The occurrence of occasional observations which are abnormally high often causes the average to be non-representative of the tests made during the month or year. For this reason the median as well as the mean should be computed for each month or year. The median is the result which lies in the middle of a series of results arranged in order from lowest to highest. For example, in the series 1, 2, 3, 8, 16, the figure 3 would be the median, while the average would be 6. To find the monthly median arrange the daily results obtained during the month in order of magnitude. If there is an odd number of tests, select the middle term; if there is an even number, take as the median the average of the two middle terms. To find the yearly median arrange the daily results for the entire year in order of magnitude regardless of the month in which they occurred. Do not take the average of the monthly median, or even the median of the monthly medians.

Particular attention is called to the rules relating to the use of significant figures in recording the results of analyses. The following table is given for reference. The results of chemical analyses should be recorded preferably as parts per million.

DETERMINATION.	RESULTS TO BE REPORTED.
Numbers of Bacteria.	*Ordinarily use two significant figures; never more than three.*
Percentage of time	To first decimal place
Percentage of B. coli tests	To nearest whole number
Chlorine	To first decimal place
Hardness	To nearest whole number
Alkalinity	To nearest whole number
Carbon dioxide	To nearest whole number
Iron	To second decimal place
Oxygen consumed	To first decimal place
Manganese	To second decimal place

In the recording of results of tests for B. coli, it is recommended that when possible the words "Positive" and "Negative" be used. If signs are used the plus and minus are the most adaptable. Where no test is made the space should be filled in with dots, and not a dash or a zero, which signs might be misinterpreted.

The B. coli index is the approximate number of B. coli per cubic centimeter, as determined from qualitative tests made upon different quantities of water. For any individual sample, it may be taken as the reciprocal of the smallest volume of water used in the test which gave a positive result. Thus, if a sample gave a positive test with 0.1, the B. coli index would be 1. divided by 0.1 equals 10. The B. coli index for a single sample is not very accurate. The B. coli index may be computed from a series of results as follows:

Write down the percentages of positive tests for the given quantities examined, expressed as decimals of 100.

Take the difference between these percentages.

Multiply each of these differences by the reciprocal of the quantity corresponding to the larger of the two percentages from which such difference was obtained.

The sum of these products will be the B. coli index.

The committee does not believe that the common method of judging the efficiency of a water purification plant by means of the percentage of removal of bacteria is satisfactory. A number of reasons why the method is of little value are given.

The proposed scheme of grading water purification plants is full of merit and the method of reporting analytical results on a uniform report blank varying but slightly according to influences which vary with the individual plants is highly to be desired. The addition of the median to the ordinary results reported is a distinct advantage. The introduction of the B. coli index furnishes a means of comparing the efficiency of the various plants adopting this scheme of reporting as regards the removal of bacteria of intestinal origin. It is not only true that it affords a definite method of comparison as to the efficiency of the plant, but also would indicate conclusively the character of the raw water which the various plants are required to handle and place in a suitable condition to be used for domestic consumption.

Sanitary Investigation of Navigable Waters.

In August 1912, Congress authorized a sanitary investigation of the navigable waters in the United States. The Public Health Service has taken up this work and has selected the Ohio River, the Potomac River and the coastal waters along the Atlantic and Gulf shores as types to be investigated.

The Ohio River was selected because it is the source of water supply as well as the means of sewage disposal for many cities along its banks. The Potomac River was selected because it is a tidal river and is the home of a great shell-fish industry. The salt waters of the ocean shores are not used for water supplies but receive sewage and furnish a site for the shell-fish industry. The results of these investigations are expected to serve as a standard for subsequent investigations.

The Ohio River furnishes an admirable opportunity for studying the principles of sewage disposal and the natural processes of self-purification of streams. It is nearly a thousand miles in length and along its banks are situated Cincinnati, Pittsburg, Wheeling, Portsmouth, Louisville and Paducah, which have been selected as centers from which to study the influence of sewage and industrial wastes on the stream. The survey embraces a study of the character and population of the watershed and amount and character of the sewage, the effect of the river on the sewage, and a complete survey of the stream and its tributaries. Samples of water are collected daily and submitted to bacteriologic, biologic and chemical examinations. By this means it is expected to determine the precise point to which the river can be utilized as a means of sewage disposal without affecting its usefulness to the country through which it flows.

The survey of the Ohio River is nearly completed, and the data obtained will soon be available for the use of those interested.

A similar survey has been made of the Potomac River and many of the same conditions have been found. The fact that oysters are grown in the Potomac River and are found to be contaminated with the sewage which the river receives, gives rise to the question whether to remove the oyster beds or to treat the sewage which is discharged into the river. The same question arises in regard to the waters of the Chesapeake Bay and the Gulf and its estuaries.

This sanitary survey of navigable waters is of national importance, for an extensive study of the boundary waters between the United States and Canada has been made. Under the treaty of 1909 between the United States and Great Britain it was agreed that the waters should not be polluted by one country to the injury of health or property of the other nation. — Abs. *J. A. M. A.*, 1915.

Dayton's Budget for 1915.

The appropriation ordinance of the city of Dayton for 1915, as passed by the City Commission and signed by the Mayor, February 6, 1915, has been published by the Bureau of Municipal Research in a pamphlet of fifty-two pages prepared for public distribution. Creating immediate interest is the partial paragraph printed on a small slip attached to the front cover of the pamphlet characterizing the budget as "modern accounting control over public funds * * * not inherent to any type of government * * * not necessarily secured by a new charter * * * established in any city governmeent if a sufficient number of citizens desire it".

The first eight pages of the pamphlet are devoted to illustrative but not entirely exhaustive lists of expenditures provided for under the seven general budget classifications of (1) personal services, (2) contractual services, (3) sundry charges, (4) supplies, (5) materials, (6) equipment and (7) lands, buildings and structures by purchase. A detailed statement of the estimated income of the city for 1915 shows a total of $1,303,809.70, while a general statement of expenditures under the seven headings above enumerated reaches a total of $1,303,467.11. A two-page tabulation of appropriations by organization units gives a definite outline of the distribution of funds for the various parts of the governmental machinery. The following table presents the main features of this tabulation.

APPROPRIATIONS FOR 1915.

City Commission	$6,600 00	
Clerk of Commission	7,175 00	
Civil Service Commission	4,275 00	
Office of City Manager	18,125 00	
Department of Law	12,000 00	
Department of Public Service	533,086 79	
Department of Public Welfare	154,934 40	
Department of Public Safety	358,548 00	
Department of Finance	101,108 00	
Municipal Court	34,071 66	
Board of Elections	37,574 50	
Board of Sinking Fund Trustees	35,968 76	
Total		$1,303,467 11

Of the twelve distinct city organization groups as above given, the Department of Public Welfare affords the greatest direct interest from a public health standpoint. This department is composed of six divisions, one of which is the Division of Health which in turn is composed of five bureaus. The office of the Commissioner of Health and the Bureaus of Medical Service, of Food Inspection, of City Laboratory and of Sanitation constitute the working organization of the Division of Health for which the following appropriations have been provided for the year.

DIVISION OF HEALTH.

Office of the Health Officer	$10,295 00	
Bureau of Medical Service	10,755 00	
Bureau of Food Inspection	6,000 00	
Bureau of City Laboratory	3,170 00	
Bureau of Sanitation	5,185 00	
Total		$35,405 00

Necessary clerical and stenographic assistance has been granted to the health officer together with provision for other necessary services and for supplies. The Bureau of Medical Service has provision made for a part-time epidemiologist at $1,200.00 per year, for five district physicians at $500.00 per year, each, for four nurses at $900. per year, each, together with a superintendent and matron for the Quarantine Hospital, at $720.00 per year. A total of about $1,600.00 has been allowed the Bureau for chemicals, drugs, medicines, foods and necessary supplies, while $1,000.00 has been designated for contractual services, such as transportation, communication and hire of equipment. The services of four sanitary officers have been secured for the Bureau of Sanitation at a salary of $900.00 per year, each, $15.00 a month more than allowed the dog catcher but $5.00 a month less than the salaries of the regular policemen or patrolman, and the same salary as paid to the four nurses. The Bureau of the City Laboratory has been granted a total appropriation amounting to double the sum allowed for the Bureau of the Dog Pound in the Department of Public Service. For advancing health giving activities the appropriations of $17,156.90 for the Divisions of Park and Playgrounds and $14,470.00 for the Division of Recreation, both organizations in the Department of Public Welfare, should not be overlooked.

Present Day Public Health Activities.

The comprehensive nature of the work of a well organized city health department is shown by Dr. Francis E. Fronczak, Health Commissioner of Buffalo, in a paper read before the 1914 session of the American Medical Association. Among the activities enumerated are — vital statistics, isolation and control of communicable diseases, anti-tuberculosis work, the "clean-up week", the campaign against flies, medical school inspection, public baths, public health education, anti-typhoid vaccination, sanitary control of factories and industries, milk inspection and licensing of dealers, and publicity through bulletins and newspaper articles. Dr. Fronczak considers vital statistics and morbidity reports fundamental and indispensible to public health work. In the anti-fly campaign the slogan "catch the fly" is urged as preferable to "swat the fly", as fly traps are much more effective than "swatters". The campaign for the elimination of the veneral disease quack should be placed in the hands of the health department, and public advertisements in newspapers and elsewhere are urged to offset the fraudulent advertising of charlatans.

The success, popularity and sanitary value of the free public baths, which Buffalo was the first city to establish, has been fully demonstrated, by the patronage of 300,000 persons annually. Only shower baths are used and these are absolutely free, even to soap and towels. A free laundry in connection is used by 10,000 annually. Considerable space is given to a discussion of the milk problem. Rigid inspection of dairies and distributors is insisted upon in Buffalo and Dr. Fronczak advocates further the licensing and examining of dealers and the pasteurization of all milk. The value of publicity in the form of department bulletins issued free and of news items in the daily press has been thoroughly demonstrated. Another method used is the distribution of small hand circulars in several languages. In conclusion the writer points out the success of public health work in reducing infant mortality and looks forward to a corresponding reduction in adult mortality. In the discussion which followed Dr. Fronczak's paper a few members took exception to the idea of a "clean-up week", the idea being that the "clean-up" work should be a continuous process. Dr. Fronczak replied that the "clean-up week" idea aroused the interest of the people and gave them a forcible reminder that it was worth while to keep clean. Owing to its nature, this paper only "touches the high places" in public health work, but it is particularly valuable for those readers who are unfamiliar with modern health work. — Abst. *Jour. Amer. Med. Assn.*

Private Public Health Agencies.

Dr. William C. Woodward in his presidential address at the recent meeting of the American Public Health Association devoted himself to a plea for efficiency and economy in the maintenance and operation of private agencies working for the conservation and promotion of public health.

Public health, he said, is nothing more than the aggregate of the health of the individuals of which the public is made up, and the protection and promotion of the public health is merely the protection and promotion of the health of the individual. — Abs. *American Public Health Journal.*

The Object of the National Organization for Public Health Nursing.

The decade from 1900-1910 witnessed a rapid expansion of public health nursing. There had been up to that time no effort to organize and standardize the work or its administration. There were no recognized requirements for the visiting nurse. There was no collective power or influence exerted by the scattered and unrelated and, generally speaking, unacquainted workers. But in June 1912, a national association known as the National Organization for Public Health Nursing was established. This is an organization of nurses and lay people, engaged in the actual work of public health nursing and in the organization, management and support of such work. It came into being because its founders recognized three rather clearly defined facts, namely: "the experience data available emphasized the urgency and practical necessity for the extension of public health nursing service to a much larger proportion of wage-earners and people of moderate means than now have the benefit of the same;" 1,492 registered public health nursing organizations, publicly and privately maintained, waited for correlation and standardization of their work and its administration; and the public was waiting for reliable morbidity statistics which these organizations could furnish to statisticians through the adoption of uniform and standard record cards.

Its members, numbering over 1,500 lay people and nurses (of whom about thirty-three per cent are lay people), are now working to these ends, both in their own localities and collectively. Nearly every state in the Union is represented. The personnel of its governing body is selected with three ends in view: First to represent all varieties of public health nursing service; second, to represent all sizes of communities; third, to represent all sections of the country.

The association helps boards of directors by uniting in common interest, members of boards all over the country, who recognize the work of the public health nurse and see in it both an opportunity and obligation to give assistance to the community, as well as to the needy, sick individual at home; it helps each board to convince its community of the need of public health nursing; it shows them how to operate an organization for public health nursing; it furnishes them with standards of nursing service and co-operates with them to maintain a high order of efficiency; it gives advice on any problems connected with the organization and administration of a public health nursing service; it assists them in finding well-trained executives to organize and develop their work and suitable nurses for their staffs.

It helps nurses by furnishing them with specific information regarding methods of procedure in public health nursing, and co-operates with them in establishing and maintaining these methods; it furnishes them with standards for efficient work and points out opportunities of extended usefulness; it advises them on any problem connected with their nursing service and helps them adjust possible difficulties; it directs them in their efforts to secure proper education and experience for public health nursing service; it acquaints them with public health workers in other communities; it helps them to find suitable positions in public health nursing.

Its ways and means of serving local associations and nurses are: A central bureau of reference; and an executive and traveling secretary, who is at the service of any society or community in need of advice, information and assistance in matters pertaining to public health nursing; uniform record cards; its magazine, The Public Health Nurse quarterly; occasional bulletin (distributed free of charge to members,) containing valuable information and practical suggestions for nurses and nursing organizations; other authoritative publications (distributed at nominal cost to others than members) on methods of organization, administration and practice of public health nursing; brief, but carefully selected bibliographies.

Perhaps nothing it has done will be more far-reaching in its effects than the share the organization has taken in the development of post-graduate courses in public health nursing education (of which there are now six) which have come into existence to meet the demand for women prepared by proper education for such varied and exacting work.

The organization stands for:

1. Active co-operation and affiliation of all public health nursing in each community, represented by a central committee on which sits a director and executive officer of each association.
2. Sound business principles and methods of administration in local associations, as distinguished from the role of "charity."
3. A fee system, rather than free service, thereby extending the benefits to others than the dependent classes.
4. Special preparation of nurses for public health nursing, both general and special, through
   (1) Post-graduate courses;
   (2) Under-graduate studies and practice.

It is interested in the possible development of sickness insurance with nursing care, which shall be available and acceptable to all people as an immediate and effective step toward free public health.

To this end it regards as worthy of most careful experiment, the extension of visiting nursing to include hourly and household nursing (the principles of which are already clearly expressed and often practiced in every well-organized visiting nurse association), thereby making the service equal to every demand upon it from all classes of society.

It hopes for universally free public health as provided in the revised Health Code of New York State:

"Public health nurses. Each health officer or other official exercising similar duties, by whatever official designation he may be known, shall have power to employ such number of public health nurses as in his judgment may be necessary within the limits of the appropriations made therefor by the city, town or village. They shall work under the direction of the health officer and may be assigned by him to the reduction of infant mortality, the examination or visitation of school children, or children excluded from school, the discovery or visitation of cases of tuberculosis, the visitation of the sick who may be unable otherwise to secure adequate care, the instruction of members of household in which there is a sick person, or to such other duties as seem to him appropriate."

It aims to demonstrate that the public health nurse is as indispensable a community servant as the public school teacher.—Abst. *The Modern Hospital.* 1915.

The Reporting of Notifiable Diseases.

The importance of reporting diseases to the Health Department is emphasized by the recent issue of notification blanks by the United States Public Health Service through the State Department of Health of Ohio. There is a marked tendency to allow the reporting of notifiable diseases to go by default, and as a result it is often extraordinarily difficult to find the degree of severity or the amount of distribution of an epidemic. In many cases the apparent mortality based on the number of deaths in comparison with the number of reported cases gives the impression that a most unnecessarily high proportion of all cases die under the care of our physicians. The natural corollary would be that the method of treatment was not very satisfactory. It is, therefore, not only an interference with the functions of the Health Department, for the support of which we all pay in our annual tax assessment, but also a reproach to the skill of the local physician, when reporting is neglected. It is, of course, probable that in many cases this lack of reporting is due to carelessness and to the bother of getting out the information. These difficulties have been to a large extent removed by the issuance of these extremely convenient notification blanks. It is to be hoped that the profession will assist to the best of its ability in the present effort to obtain accurate knowledge as to the presence and distribution of reportable diseases. — Editorial Cleveland *Medical Journal*, 1915.

Inoculation Against Chickenpox.

Numerous efforts have been made to transfer chickenpox by inoculation, but until the experiments of Kling all results have been negative. Recently in Stockholm this investigator has succeeded in producing immunization by means of a local reaction. He believes that former investigators failed because of the methods they employed. The virus should come from a healthy child free from syphilis and tuberculosis, and should be the clear content of a fresh vesicle in the early stage of the development of the disease and of the vesicle itself. After a suitable vesicle is selected, the point of a sterile lancet is inserted through the vesicle and into the serum. The point of this lancet is then inserted into the skin of the child to be inoculated. It is necessary that the skin of the arm should be previously clean and the effort is made to insert the virus without drawing blood. When two or three such insertions are made, new virus is taken and the process repeated until these inoculations have been made. The arm should then be properly bandaged and after a day or two the mild traumatic reaction subsides. If the result is obtained on the eighth day, one or more red papules develop in the inoculated area which in the course of twenty-four hours changes into a vesicle, which after increasing in size for two or three days drys into a scab much as an ordinary vaccination. Occasionally several vesicles may appear in succession and Kling has inoculated successfully from one individual to another. Up to the present time 135 cases have been inoculated with only 23 per cent of failures. Only in ten instances was there any eruption outside of the inoculated area, and in three instances there was a general eruption. As a rule there are no general disturbances but occasionally a slight fever is noticed. Evidence that protection is established is furnished by the fact that in the children's hospital in which Kling has been experimenting none of the inoculated children acquired chickenpox, while 73 per cent of the 108 which were not inoculated developed the disease. This proves that the inoculation is a good means of prevention, which may be of practical value, especially in those situations in which chickenpox is sometimes severe. Kling calls the inoculation "varicellation". — Abst. *J. A. M. A.*, 1915.

The Sanitation of Swimming Pools.

According to some authorities the instinctive desire for cleanliness marks the beginning of culture, or at least indicates a tendency in that direction. The civilized people who take pride in the cleanliness of their own bodies cannot endure filth in any form. Proper care of the skin through the installation of public baths is not modern, for their maintenance was an important problem of state in ancient Rome. The baths of Diocletian accommodated hundreds. The homes of most ordinary citizens of today afford the opportunity for proper bathing. For the poorer classes of people the public bath is coming to be considered as a necessity rather than a luxury, and is deemed as essential in maintaining health and vigor as food, air, and proper exercise. However, there are hygienic dangers in connection with public bathing. The popularity of some pools has led to investigation of the sanitary conditions which prevail in them and there is little doubt but what they are capable of transmitting disease.

When the use of some pools is made compulsory, as it is in some schools, the responsibilities of strict sanitary supervision is evident. Three cases of diseases are most prominent among those classed as communicable from the use of swimming pools; namely, intestinal, eye and ear, and venereal. The most important are those which affect the intestinal canal and of this class typhoid fever and diarrhœal conditions have ben traced to swimming pools such as those found installed in colleges, schools, gymnasiums, clubs, etc. Examination of the water for colon bacilli as an index of pollution is taken as a standard method of control as in the case of drinking water. Investigations of the bacteriologic laboratories at Columbia University show that the sanitary conditions in the swimming pools in New York colleges are very good, largely because of the supervision of those in charge. In one of these pools the bacteriological condition of the water closely approximated ordinary drinking water. Proper hygienic perfection is accomplished largely by proper administration of the plant. Together with this it is necessary to have a proper source of water, frequent refilling and dilution and careful rules regarding pool sanitation. Refiltration of the pool water is both useful and economical, especially when combined with chemical disinfection of the water.

Those pools which are open to the public without admission fee or restrictions are generally attended by a good class of people, and are usually elaborately equipped and properly operated. Some authorities maintain, however, that because of the large and promiscuous attendance they are sources of infection.

Association pools which secure a higher and cleaner class of patrons and which usually charge an admission fee vary in their sanitary condition, depending upon the attendants, preliminary baths taken by the bathers and the extent of chemical disinfection.

From the above statements it is obvious that all pools and public baths should be under the supervision of competent sanitarians. It would also seem that aside from ideal construction, proper equipment and personal hygiene, refiltration and chemical disinfection are the most efficient means of keeping the water in the swimming pool in proper sanitary condition. — Abst. *J. A. M. A.*, 1915.

Pay Patients in Isolation Hospitals.

The question of whether or not patients suffering from communicable diseases should be obliged to pay for their care — if they can — in publicly supported special hospitals, has been a much mooted one for a long time. A good many health officers, Dr. George B. Young, of Chicago, among them, have insisted that these patients are not taken care of at the public expense for their own sake, but as a protection to society, and consequently should not pay.

A good many members of the medical profession insist that people able to pay should be made to do so, and that they should be permitted to employ their own private physician, who should be allowed the privileges of these publicly supported hospitals.

The New York Department of Health has recently made some exhaustive inquiries into this matter and has issued the following order for that city:

From time to time public or private criticism is made of the gratuitous treatment in the hospitals of the Department of Health of patients suffering from infectious diseases.

In those municipal hospitals where other classes of patients are treated, it is now the accepted policy of the city to require the payment of hospital charges by those patients who, upon investigation, are found to be able to pay. Whether this later policy may wisely be applied to infectious cases is a question.

There is a distinction to be made between patients suffering from infectious diseases and those suffering from other forms of disease; the former are not as a rule eager to become hospital patients, but their hospital isolation is, in many cases, desirable for the protection of the community. If the payment of a hospital fee were demanded as a prerequisite to admission, how many of these patients would be willing to enter a hospital? And, apart from the question of the willingness of the patients to pay, how many would be able to pay?.

In order to answer this question, an investigation was recently conducted by the Bureau of Infectious Diseases, which showed that a very large majority of the patients treated in the hospitals of the Department of Health come from poor families. There is apparently very little if any abuse of the hospital facilities provided by the city for the treatment of patients suffering from infectious diseases.—Abst. *The Modern Hospital,* 1915.

National Control of Quarantine.

Since 1888 the United States has secured control of the quarantine service at sixty-six ports, Boston being one of the latest ports to relinquish local control to the Public Health Service. Full control in matters of quarantine have not been transferred to the National Government at the ports of New York, Baltimore and Galveston, although the question has been actively pressed particularly in the first named port, New York. The belief exists that state or local quarantine is superfluous, especially in the case of the port of New York where the state quarantine officers to be sure make the first inspection but where no steerage passengers can land until inspected at the federal immigrant station at Ellis Island, necessitating thereby two examinations for this large class of persons. The Merchants' Association of New York has requested that the complete transfer of quarantine control to the National Government be made and the Public Health Committee of the New York Academy of Medicine has passed resolutions in favor of making such a change. There is opposition, however, to the transfer even on the part of medical men inasmuch as the committee on Public Health of the Medical Society of the State of New York in its report at the annual meeting held in Buffallo, April 26-29, 1915, reiterated an opinion expressed in a former report that the Quarantine Station should remain a state and not become a federal institution and that furthermore the Governor and others in authority should be liberal in securing appropriations for the Quarantine Station in view of the fact that the United States will undoubtedly be menaced with cholera and other highly communicable diseases after the European war has ceased.

Against this latter point may be advanced the argument that in any threatened importation of typhus fever, cholera or any other dangerous diseases now prevalent in the warring countries of Europe, the United States Public Health Service would take entire possession of quarantine at all ports, as it has the right to do in case of emergency, and that consequently it would be preferable for the regular federal offices to be already in control rather than be compelled to take hasty control. It is, therefore, evident that there exists marked differences of opinion based on other than the economic consideration of the transfer which would result in a saving to the state of New York alone of large annual appropriations.

Tuberculosis Prophylaxis in Childhood.

In discussing this subject, Dr. G. Schenker Aaran reached some interesting conclusions:

1. The diminution of vitality is, generally speaking, the cause of diseases in the human being. Especially does this condition favor the appearance of tuberculosis. If we wish to combat tuberculosis, we must seek to raise the vitality, not only of the individual but of the nation.

2. Prophylaxis is then our main weapon in the anti-tuberculosis campaign.

3. Prophylaxis must however commence in the earliest period of childhood — even before that, with the parents of the child.

4. Those who wish to bear healthy children must themselves be healthy. — Racial hygiene. — For this purpose propagation must be restricted under certain circumstances. Sterilization by Röntgen rays. — Weak or tuberculous women, or women who show a tendency to tuberculosis, and with whom births follow quickly one upon the other, should, with the full consent of man and wife and supported by the approval of two physicians, be permitted to submit themselves to the process of sterlization.

5. A greater degree of protection, more rational food, and care of the mother before, during and after birth, especially in the case of women without means, and of women giving birth to illegitimate children. If necessary, the women should be given protection in confinement homes. Protection for mothers and protection for children.

6. Rational feeding and care of the infant by the mother. Mother milk.

a) In order, however, to ensure to the young mother the necessary knowledge, and assistance, she should be placed as 16 to 20-year-old girl in a compulsory continuation school for women, where she can be instructed regarding the duties and rights of woman as wife and mother. Premiums for nursing mothers.

b) Better education and training of physicians in the treatment of children's diseases.

c) . Better training of wet-nurses and district sick-nurses in the proper nourishment and care of infants, as well as in the recognition and prevention of tuberculosis.

d) Education and training of nurses for infants, who by advice and action shall work amongst the people in the interests of a better standard of nourishment and more rational care of infants.

7. Removal of children from families which seem in danger of contracting tuberculosis, or whose poor standard of food and lack of home-care is harmful to the child. Protection and care of the children in infant-homes, children's homes or suitable families (Grancher), until the family conditions of the parents again become healthy and normal.

8. Foster-children and illegitimate children must be watched over officially with especial care in the places where they are boarded out. — The procurement of "professional guardianship" for such children. — Inadequate increase for boarded-out children must be strictly forbidden, and prevented.

9. Establishment of good, up-to-date children's homes, under medical supervision, for the care of children who are physically, mentally or morally weak; in connection with such homes, rationally conducted schools for children's nurses. Substantial State support of such institutions.

10. Physical, mental and psychical education of the child with the harmonious co-operation of the parents, home and the school, according to the principles of Pestalozzi.

11. Energetic combating of commerce in children.

12. Instruction and co-operation of the mothers for the early training of the child to habits of cleanliness (care of the skin, mouth and teeth.)

13. School care for the health of the child.

a) Entrance into the board-school shall not be determined according to the age of the child, but according to his physical and mental development.

b) Reform of the teaching curriculum to the end that more attention may be given to the physical and mental well-being of the child.

c) Improvement of the personal hygienic condition of school-children by athletics, games, excursions, summer forest-schools, school swimming baths, feeding of the children, "holiday colonies", preliminary military training for the young.

d) Periodic medical visitation of the school, with examination of school, teachers and scholars, both in town and country. Teachers and pupils affected by infectious diseases must be excluded from further attendance at the school until after recovery.

e) Teachers whose work is not wholly up to standard as a result of sickness or old age should be suitably and timely pensioned.

14. It is the duty of the State to combat tuberculosis in the most far-reaching manner possible by general welfare measures.

I. By legal regulations:

a) Legal control of foods.

b) Proper hygiene in dwellings.

c) Periodic inspection of all rented dwellings, boarding places, inns and hotels, children's homes, etc., and doing away with all sanitary deficiencies therein found.

d) Establishment of gardens and parks with play-grounds. Bathing establishments with swimming pools. Sledging and skating places. Light and air-bath establishments, etc.

II. By financial and moral support of public welfare institutions, which are directly or indirectly devoting themselves to the combatting of tuberculosis and care of children. Tuberculosis leagues; protection of women and children; "children's kitchens" for the poor; children's homes; créches; children's sanatoria; forest-schools, etc.

III. By public enlightment of the nation, especially the youth of the nation, concerning care of the national health, and proper sick-nursing.

a) By the holding of courses for the care of health, sick-nursing and ambulance-work.

b) By the arrangement of public lectures by physicians, taking up the main provinces of hygiene and sick nursing. (e. g. once or twice a month in the churches.)

N. B. It is absolutely necessary that physicians, as guardians of the physical well-being of the nation should in the future put more effort into the prevention rather than cure of disease. This may be accomplished also by the education of the people through lectures, etc.

c) By popularly treated articles in the press.

d) By traveling exhibitions.

e) By cinematographic displays, free of charge, dealing with hygienic themes — these especially for the young.—Abst. *Bulletin International Anti-tuberculosis Association.*

The Geographical Spread of Tuberculosis Infection.

A. Calmette-Lille in discussing the geographical spread of tuberculous infection and the relative predisposition of the various human races to such infection reaches the following conclusions.

The spread of tuberculosis throughout the world is closely connected with the degree of culture and the extent of commercial exchange obtaining in each country.

Tuberculosis is not spread by tuberculosis patients alone but also by a great number of apparently healthy people who, bearing bacilli about with them, propagate the same by excretions of all kinds.

Tuberculosis statistics show that in Europe about 90% of all grown persons have been unable to defend themselves from tubercular infection.

The natives of Africa have remained safe from the inroads of tuberculosis as long as they could protect themselves from slavery. The infectious material was introduced and spread amongst them, the extension of the disease being promoted by the Arabs and by the conquering or trading Europeans.

No human race can withdraw itself from the reach of tuberculosis, and no race possesses natural immunity in any degree.

Climate exercises absolutely no influence upon the more or less marked frequency of the disease. Tuberculosis takes place just as frequently and its appearance is just as serious amongst the Esquimos and the Laplanders as amongst the negroes of the Congo State or the Kanaki of the New Hebrides. If, generally speaking, these races suffer less than the Europeans, this is exclusively owing to their habit of living together in less numerous groups, and also owing to the nomadic life which some of them habitually lead.

It has often been noticed that in cities in which tuberculosis is conspicuously present, the Jews show a lower rate of mortality than the remainder of the population. Statistics compiled in regard to the United States, Austria, England and Tunis are especially interesting in this respect. The immunity of the Jews is however only apparent, for their mortality rate is approximately the same as in the case of the Christians.

If the appearance of the symptoms which quickly lead to death is rarer with the Jews, this must, it seems be attributed to the fact that their life is more frequently spent in thickly populated cities, and that their mode of life from childhood on exposes them constantly to the slighter forms of infection, the immunising effects of which are today well known. Moreover they are seldom exposed to the ill effects of alcoholism and excessive physical strain, which in the case of the other branches of the white race and still more of the negroes are such significant factors in promoting the spread of the disease.

All human races, then, are exposed to the inroads of tuberculosis. And if amongst the population of the various countries, a significant difference presents itself in the tuberculosis mortality rate, this is solely dependent upon the fact that the infection through bacilli has been implanted a longer or shorter time before, and that the opportunity for infection is sometimes rarer and sometimes more frequent, according to the living conditions in each case.—*Abst. Bulletin International Anti-tuberculosis Association.*

Indians and Tuberculosis.

Dr. John H. Ally, Superintendent of the United States Sanatorium for Indians at Fort Lapwai, Idaho, says he is convinced, after a study of the causes of death among the Nez Perces Indians for the last ten years, that 90 per cent of all the deaths are due directly or indirectly to tuberculosis. In the hundred years that have elapsed since the historic expedition of Lewis and Clarke to the Northwest, the Nez Perces tribe has diminished from 8,000 to 1,300. The present tuberculosis death rate is about 40 per thousand living, or two and one-half times the rate in the United States as a whole. Dr. Ally traces the cause of the decimation to the change in the mode of living of the Indians from the open air life of the plains to the sedentary, settled life of the reservation. The latter has brought with it the danger of house infection which was automatically eliminated in the earlier days. "Ventilation", says Dr. Ally, "is completely foreign to an Indian's nature. It is with great difficulty that you can get them to pay heed to this important part of sanitation. I have known twenty or thirty to gather in a small room where an advanced case of tuberculosis has been housed for months, and to close all the doors and windows, even plugging up the keyholes."

In a recent report of the office of Indian affairs, Commissioner Sells points out that there are approximately 25,000 Indians in the United States suffering from tuberculosis, and that the available government facilities for their care will not exceed 300 beds.—Abst. *Bul. Internat. Anti-tuberculosis Assn.*

Prenatal Care.

Basing his conclusions on the study of 705 fetal deaths occurring in 10,000 consecutive admissions to the obstetrical department of the Johns Hopkins Hospital, J. Whitridge Williams, Professor of Obstetrics, Johns Hopkins University, contends that too narrow a view is ordinarily taken of the scope of prenatal care, which is regarded on the one hand almost solely as a means of preventing toxemia and on the other as a side issue in the propaganda for breast feeding. Effective prenatal work in connection with a general hospital should be conducted primarily from the dispensary, irrespective of whether prospective patients expect to be treated in the hospital or in their own homes. The purely medical work should be carried on by medical men sufficiently well trained to make a reliable diagnosis, a considerable proportion, at least, being assistants living in the hospital in order that the indoor and outdoor departments may be satisfactorily coordinated. The prenatal nurses should be graduate nurses with considerable obstetrical experience, with social service training and adequate salaries.

Patients should be encouraged to come to the dispensary as early as possible in pregnancy. After registration a careful physical examination should be made and results recorded. Such an examination should not be limited to obstetrical conditions but should include the entire body, with special reference to syphilis, tuberculosis and the conditions of the kidneys. If everything is apparently normal the patient may be registered as an outdoor patient, otherwise she should be registered as a prospective hospital patient. Outdoor patients should be visited in the homes, within a week after registration, by prenatal nurses and where conditions seem unfavorable patients should be encouraged to enter the hospital. The printed directions concerning the hygiene of pregnancy should be amplified by the instructions of the nurses. All patients should be examined one month before expected confinement and nurses should ascertain that all necessary arrangements are satisfactory. After the birth of the child patients should be persuaded to register at the children's clinic in order that the baby may be under supervision during the first year. Prenatal care should not end at the birth of any one child but the work should be organized to care for future pregnancies. Particularly in cases of the existence of syphilis, a mechanism should be developed which would insure proper treatment. Patients requiring operative treatment should be provided for, not only for their own sake but for that of unborn children. Particularly should syphilitic conditions be carefully attended, since Dr. Williams' tabulation of causation of the 705 death places syphilis at the top of the list with a percentage of 26.4 or 186 death of the total number. Unknown causes of death may have concealed an additional number due to undetected syphilis, 127 of the 705 deaths arising from undetermined causes. Prematurity caused fifty of the deaths, 7.1 per cent, and toxemia for forty-six, or 6.5 per cent, white children in the latter cases being involved three times more frequently than black. A portion of one of Dr. Williams tabulations presents the following facts in the causation of the 705 fetal deaths which occurred during the study of the 10,000 admissions to Johns Hopkins Hospital.

CAUSATION OF 705 FETAL DEATHS OCCURRING IN 10,000 CONSECUTIVE ADMISSIONS TO OBSTETRICAL DEPARTMENT, JOHNS HOPKINS HOSPITAL.

Cause.	*White.*	*Black.*	*Total.*	*Percentage of Incidence.*
Syphilis	35	151	186	26.4
Unknown	39	88	127	18.0
Dystocia	61	63	124	17.6
Prematurity	14	36	50	7.1
Toxemia	32	14	46	6.5
Deformity	18	6	24	3.4
Inanition	11	12	23	3.3
Placenta Praevia	20	2	22	3.1
Various	43	60	103	14.6
Total	273	432	705	100.0

Dr. Williams estimates that the fetal mortality in the cases studied could have been reduced 40 per cent, a saving of 300 children, had it been possible for all patients to have had the prenatal care above outlined, together with practically ideal obstetric care. (Abst. *Limitations and Possibilities of Prenatal Care*—Williams.)

Mortality of the New-Born.

Using statistics secured from records of 10,000 consecutive births at the Sloane Hospital for Women, New York, Dr. L. Emmett Holt and Ellen C. Babbit have supplemented available statistics of infant mortality in the following concrete statement that of one hundred infant death during the first year approximately

33 occur in the first month
28 occur in the first two weeks

22 occur in the first week
13 occur on the first day.

Of 9,318 infants born alive in the hospital, records show the death of 1.5 per cent on the first day, 2.5 per cent within one week, and 3.1 per cent during the first fourteen days.

The causes of premature births in many of the cases were not recorded but certain facts were obtainable from the records. The age of the mother seemed to be without influence. In 90 cases of premature births the mother was a multipara and in 70 cases a prinipara. The baby's condition was recorded as good in 13 per cent of the cases, fair in 31 per cent, poor in 56 per cent.

The mortality of accidents of labor, hemorrhage, sepsis and asphyxia made up but 20 per cent of all deaths within the first fourteen days. Malformations and congenital diseases other than syphilis caused 4 per cent of deaths. The only important disease developing after birth was pneumonia. The study of cases at Sloane Hospital, as well as similar studies, tend to the conclusion that while the campaign for the reduction of infant mortality has greatly lowered the deaths from diarrheal and nutritional diseases and has made some considerable impression on respiratory and contagious diseases, thus far it can hardly be said to have touched at all the causes of the large group of deaths in the first month. (Abst. *Institutional Mortality of the New-Born,* Holt and Babbitt.)

Bulletins U. S. Department of Agriculture.

Two bulletins have been issued recently by the United States Department of Agriculture which are of great interest and value in promoting a better understanding of rural living conditions. Report No. 103 deals with "Social and Labor Needs of Farm Women", and report No. 104 takes up "Domestic Needs of Farm Women". These bulletins will be sent free upon application.

Attacks on the Health Law of New York State.

During the session of the present Assembly at Albany five bills have been proposed to amend the recently enacted public health laws of the state. While in committee, active agitation against the bills was inaugurated, particularly against the second bill introduced, reducing the number of sanitary districts from a minimum of twenty to a maximum of ten and fixing the salary of the sanitary supervisor of each district at a maximum of $2,500, doubling the work of the supervisor while reducing his salary twenty per cent. An editorial in Medical Record opposing this particular change, as well as the other four amendments, estimates that as a direct result of the work of the health department of the past year, two thousand persons are alive in the state outside of the city of New York who would otherwise have died from preventable cause. A further estimate is made that this year will see the saving of more than three thousand additional lives and yet proposed amendments involving the financial saving of only $35,000 are advocated in place of this saving in lives. The entire appropriation asked for the State Department of Health for the year is about $400,000 and provides for the present expert supervision which has been secured for the state under the new organization. One of the proposed amendments is objectionable for its obvious insinuation since it provides that the present law shall be amended to require that instead of the Commissioner of Health not being permitted to "engage in any occupation which would conflict with the performance of his official duties" that he "shall devote his entire time to the duties of his office". As a matter of fact the duties of the Commissioner of Health have been so exacting that practically his entire time has been devoted to his work. The fifth amendment proposed is wholly objectionable in every respect since it provides that the Public Health Council shall have no power to establish sanitary regulations but that such power rest with the Assembly. The present Sanitary Code of the state would, therefore, be abolished unless the Assembly would see fit to adopt this code, which would certainly be doubtful in view of the fact that the high standards of the code would scarcely meet with the approval of assemblymen so amending the present health laws.

The Health of Our Summer Resorts.

It was formerly believed that a good climate, charm of location, and beautiful scenery were the chief attributes necessary for a successful summer resort, but at the present time people are more critical and demand that summer resorts present better sanitary conditions than has been thought necessary heretofore.

Vacation typhoid is recognized as a serious health hazard, and before selecting a place for a summer vacation most careful persons make inquiry in regard to the sanitary conditions of the place in question. The town of York, Maine, has adopted a code of rules which may well serve as a model for all summer resorts. Because of the fact that there were a number of cases of typhoid at York last summer an expert was secured to make a sanitary survey of the premises. The recommendation of this expert was that the services of a full-time health officer were necessary. Acting upon this recommendation, the town appropriated $2,500 a year and a graduate of the school for health officers of Harvard Technology was chosen to act as health officer.

The town of York is now spending $1.00 per capita per year for health purposes. The citizens have recognized that health is purchasable if proper appropriation is made. It is very likely that other summer colonies will find it to their advantage to adopt similar methods of safeguarding the health of their visitors. People are now aware of the dangers that lurk among poor sanitary conditions and demand better accommodations than are supplied by the average summer resort.—Abst. J. A. M. A., 1915.

The Universal Tipple.

Coffee and tea are the two beverages used almost universally by the adult population throughout the civilized and semi-civilized world.

It is impossible to say how many tens of millions of dollars are expended upon them annually. Although their use has steadily increased they might be discontinued by the multitudes who have formed the habit without the loss of any benefit and in the majority of cases abstinence would result in distinct physical gain.

Neither coffee or tea are to be considered foods. Both are stimulants and it is this which is responsible for their popularity. As with all other stimulants there is a continual tendency to over indulgence because a moderate allowance after a time fails to give the necessary incitement to the nervous system.

While the mind is often stimulated to good work for a short time by coffee or tea any stimulus which they give is transitory for there is a period of depression following the use of all stimulants. Experiments have shown that over indulgence in both have a tendency in the long run to dull the working of the mind.

A moderate use may not be followed by any noticeable ill effect but nervousness and disturbances of the digestive system are almost certain to follow the excessive use of either. Tea has an astringent action which is often harmful.

Any value which might follow from the use of a warm beverage with meals, where the majority of the food is below the body temperature, is probably offset by this action. Hot water or the "cambric tea" (hot water, whole milk and sugar) of our childhood days is far better.

Many people rely upon coffee and tea almost entirely as beverages and fail to drink the proper quantity of pure water.—*Little talks on Health and Hygiene* by Samuel G. Dixon, M. D., LL. D., Commissioner of Health.

REPORT OF THE HYGIENIC LABORATORIES, OHIO STATE BOARD OF HEALTH, FOR THE MONTH ENDING APRIL 30, 1915.

Diphtheria: Positive 49, negative 116, suspicious 12	177
Tuberculosis: Positive 108, negative 311, Suspicious 1, unsatisfactory 1	421
Typhoid: Positive 6, negative 51, atypical 3	60
Rabies: Positive 11, negative 6, unsatisfactory 1	18
Malaria: Unsatisfactory 1	1
Miscellaneous 12	12
Total diagnostic	689
Existing water supply 38, proposed water supply 10	48
Typhoid 13, quality 29	42
Stark County Survey 101	101
Columbus Tap 43	43
Miscellaneous 2	2
Total water	246
Total number of examinations classified as above	935

Date reported: May 8, 1915.

REPORTED CASES OF NOTIFIABLE COMMUNICABLE DISEASES, APRIL, 1915.

	Cities.	*Villages and Townships.*	*Total.*
Tuberculosis (all forms)	622	99	721
Pneumonia	285	259	544
Typhoid Fever	122	52	174
Diphtheria	358	105	463
Whooping Cough	381	277	658
Measles	1,730	1,642	3,372
Scarlet Fever	405	398	803
Chickenpox	729	349	1,078
Smallpox	112	376	488
Mumps	379	460	839
Gonorrhea	75	63	138
Syphilis	69	23	92
German Measles	235	130	365
Meningitis, Epidemic, Cerebro-spinal	14	4	18
Poliomyelitis, Acute Anterior	2	4	6
Ophthalmia Neonatorum	74	6	80
Trachoma	23	11	34
Tetanus	3	1	4
Malaria	4	....	4
Septic Sore Throat	....	2	2
Anthrax, Human	1	....	1
Pellagra	....	1	1
Trichinosis	1	....	1
Totals	5,624	4,262	9,886

COMMUNICABLE DISEASES, APRIL, 1915.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
ADAMS COUNTY—										
Manchester ... *Vil.*			1							
Monroe ... *Tp.*	1									
ALLEN COUNTY—										
Delphos ...	1	1				3		4		
Lima ...	2	2		2	2	8	4	3	1	
Lafayette ... *Vil.*										1
Amanda ... *Tp.*							1			
Bath ... *Tp.*							1			
Monroe ... *Tp.*	1	2				8				
ASHLAND COUNTY—										
Loudonville ... *Vil.*									4	
Polk ... *Vil.*		1								
Hanover ... *Tp.*									1	
ASHTABULA COUNTY—										
Ashtabula ...	2			1			1	2		
Conneaut ...			4	12						
Geneva ... *Vil.*	1	8								
Jefferson ... *Vil.*	2	2						8		
Austinburg ... *Tp.*		1								
Colebrook ... *Tp.*	1									
Conneaut ... *Tp.*			2							
Geneva ... *Tp.*		2							2	
Kingsville ... *Tp.*						5				
Lenox ... *Tp.*		1		1						
Monroe ... *Tp.*		1						1		
Trumbull ... *Tp.*		1								
ATHENS COUNTY—										
Athens ...						27				
Buchtel ... *Vil.*		1				125				
Chauncey ... *Vil.*		1								
Coolville ... *Vil.*	1									
Alexander ... *Tp.*	1									
Athens ... *Tp.*						10				
Lodi ... *Tp.*		2				2				
Rome ... *Tp.*	1					3				
Trimble ... *Tp.*		8		1				8		
Troy ... *Tp.*		1								
AUGLAIZE COUNTY—										
St. Marys ...				2			8		3	
Wapakoneta ...			1							
Minster ... *Vil.*									8	
New Bremen ... *Vil.*							2			
Duchouquet ... *Tp.*							5			
Jackson ... *Tp.*							8			
Logan ... *Tp.*										2
Noble ... *Tp.*							1			
Washington ... *Tp.*							8			
BELMONT COUNTY—										
Bellaire ...		4	4	2	3	6	5	6		
Martins Ferry ...	1		1		4	1	3	1		
Barnesville ... *Vil.*			1			6		4		
Bridgeport ... *Vil.*							8			
Brookside ... *Vil.*							1			
Holloway ... *Vil.*			1			1				
Colerain ... *Tp.*		1								
Goshen ... *Tp.*						5				
Pultney ... *Tp.*	1									
Wayne ... *Tp.*	1	1			5	8		6		
York ... *Tp.*	1	1								

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.*	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
BROWN COUNTY—										
Hamersville *Vil.*							2			
Sardinia *Vil.*							1	1		
Byrd *Tp.*		2								
Clark *Tp.*							1			3
Jefferson *Tp.*							1			
Pike *Tp.*			1					1		
Union *Tp.*		2					4			
BUTLER COUNTY—										
Hamilton	12	1		1	1	3	2	2		1
Middletown	3	6	1	5	2	36	1	1		2
College Corner *Vil.*								1		1
Oxford *Vil.*						1		2		
Seven Mile *Vil.*					2			10		
Somerville *Vil.*						1				
Madison *Tp.*										1
Milford *Tp.*						5				
Reily *Tp.*							1	2		
Ross *Tp.*										5
Union *Tp.*										3
Wayne *Tp.*						1				
CARROLL COUNTY—										
Carrollton *Vil.*			1				1	8		
Monroe *Tp.*			1							
Perry *Tp.*							1			
Washington *Tp.*								3	1	
CHAMPAIGN COUNTY—										
Urbana	4					2				
North Lewisburg *Vil.*						2				
Springhills *Vil.*								9		
St. Paris *Vil.*										3
Concord *Tp.*										7
Harrison *Tp.*								4		
Johnson *Tp.*	1									
Rush *Tp.*		1								
Salem *Tp.*	1									
Urbana *Tp.*							1			
CLARK COUNTY—										
Springfield	16	4	3	9	3	2		26		21
Donnelsville *Vil.*						1				5
South Charleston *Vil.*						1				
Bethel *Tp.*		2				2				
Madison *Tp.*							1			
Mad River *Tp.*							1			2
Pleasant *Tp.*				1						
Springfield *Tp.*			1	4				2		
CLERMONT COUNTY—										
Bethel *Vil.*							4			
Loveland *Vil.*								1		1
Milford *Vil.*				1		1				
Williamsburg *Vil.*						1				
Batavia *Tp.*								1		
Goshen *Tp.*	1							2		
Jackson *Tp.*		1			4	4				
Pierce *Tp.*										2
Stonelick *Tp.*		1								
Union *Tp.*										2
Wayne *Tp.*	1									
CLINTON COUNTY—										
Clarksville *Vil.*			1			1				20
New Vienna *Vil.*	1	2								
Sabina *Vil.*					1					
Green *Tp.*		1								
Union *Tp.*			1							6

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.		Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
COLUMBIANA COUNTY—											
East Liverpool		3			1	1		8	2	35	
Salem		2			1		1	1	19		
Wellsville		1	1	3				1		8	
East Palestine	*Vil.*	1									
Leetonia	*Vil.*				1				2		
Lisbon	*Vil.*		1		1						
Salineville	*Vil.*							3	1	2	
Middleton	*Tp.*										4
Perry	*Tp.*							1	1		
Unity	*Tp.*		1								
West	*Tp.*						1				
COSHOCTON COUNTY—											
Coshocton					2			1			
Warsaw	*Vil.*						1				
Adams	*Tp.*										2
Bedford	*Tp.*										5
Clark	*Tp.*						1		1		
Crawford	*Tp.*							3		25	
Keene	*Tp.*							2			
Linton	*Tp.*				2						
New Castle	*Tp.*		1								
Oxford	*Tp.*									1	
White Eyes	*Tp.*									7	15
CRAWFORD COUNTY—											
Bucyrus		1			1	1	1				
Galion					2				1		
Crestline	*Vil.*						1			1	
New Washington	*Vil.*							2			
Bucyrus	*Tp.*					1					
Cranberry	*Tp.*							3			
Jackson	*Tp.*	1									
Jefferson	*Tp.*							2			
CUYAHOGA COUNTY—											
Cleveland		163	161	11	136	153	719	68	225	16	85
East Cleveland					4	2	18	5	1		
Lakewood			3			2	24		5		2
Bedford	*Vil.*						3				
Berea	*Vil.*									20	
Chagrin Falls	*Vil.*				1			1			
Cleveland Heights	*Vil.*				1		6	2	5		
East View	*Vil.*				2						
Euclid	*Vil.*						3				
Shaker Heights	*Vil.*						2				
West Park	*Vil.*		2		3			1			
Independence	*Vil.*		1								1
Brook Park	*Vil.*									1	
Bedford	*Tp.*						2				
Brooklyn	*Tp.*		1								
Euclid	*Tp.*		1				4		1		
Independence	*Tp.*					3					1
Mayfield	*Tp.*						1				
Middleburg	*Tp.*									31	
Olmsted	*Tp.*									1	
Royalton	*Tp.*		2			2					
Solon	*Tp.*						2				
Strongsville	*Tp.*		2								
DARKE COUNTY—											
Greenville		1	1			2					
Ansonia	*Vil.*					6			12		
Arcanum	*Vil.*									3	
Castine	*Vil.*								1		
New Weston	*Vil.*						2				1
Pitsburg	*Vil.*										2

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
DARKE COUNTY—Concluded.										
Versailles *Vil.*					3		26			
Adams *Tp.*					2					15
Butler *Tp.*		1					1		12	
German *Tp.*							1			
Greenville *Tp.*							1			
Jackson *Tp.*						12				
Monroe *Tp.*			3				3	3		
Patterson *Tp.*							1			
Richland *Tp.*							1			
Van Buren *Tp.*							2			
Wabash *Tp.*						3				
Washington *Tp.*						7				
Wayne *Tp.*							11			
York *Tp.*				1			1			8
DEFIANCE COUNTY—										
Defiance	1			1		34	25			
Ney *Vil.*							3			
Defiance *Tp.*						25				3
Highland *Tp.*						1	2			
Mark *Tp.*						3	1			
Noble *Tp.*						5				
Richland *Tp.*						2				
Washington *Tp.*						4	2			
DELAWARE COUNTY—										
Delaware							2	2		2
Sunbury *Vil.*						3				
Berkshire *Tp.*						4				
Concord *Tp.*							4	2		
Genoa *Tp.*						16				
Marlborough *Tp.*								1		
Orange *Tp.*		2								
Porter *Tp.*							1			
Scioto *Tp.*							1			
Trenton *Tp.*						5				
Troy *Tp.*	1				1					1
ERIE COUNTY—										
Sandusky	5					1		12	7	
Berlin Heights *Vil.*		1								
Kelleys Island *Vil.*	1									
Vermilion *Vil.*						3		1		
Florence *Tp.*	3	8				2				15
Margaretta *Tp.*									1	
Oxford *Tp.*		1								
Perkins *Tp.*	1									
FAIRFIELD COUNTY—										
Lancaster				1		23	2			
Bremen *Vil.*		1				1				
Carroll *Vil.*						2				
Pickerington *Vil.*		2								
Pleasantville *Vil.*					2					
Greenfield *Tp.*						1				
Rush Creek *Tp.*		1				2				
FAYETTE COUNTY—										
Washington C. H.								4		
Bloomingburg *Vil.*	1									
Jefferson *Tp.*				1						
Madison *Tp.*					1	1				
Wayne *Tp.*		1								
FRANKLIN COUNTY—										
Columbus	49	1	5	12	57	183	11	38		
Bexley *Vil.*						25				
East Linden *Vil.*						1				

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
FRANKLIN COUNTY—Concluded.										
Gahanna *Vil.*						1				
Grandview Heights *Vil.*					3					
Harrisburg *Vil.*					4					
Linden Heights *Vil.*	1		1			2	1			
Westerville *Vil.*	2	1				52		1		
Hanford *Vil.*					1	1				
Blendon *Tp.*						14				
Franklin *Tp.*						1				
Hamilton *Tp.*					1	2				
Jackson *Tp.*	1									
Marion *Tp.*		1				4				
Mifflin *Tp.*				1			1			
Plain *Tp.*	1	1				2				
Sharon *Tp.*						1				
FULTON COUNTY—										
Lyons *Vil.*										2
Swanton *Vil.*							1			
Wauseon *Vil.*					1		1			
Dover *Tp.*		2			4	1				
Franklin *Tp.*										5
Gorham *Tp.*										6
Swan Creek *Tp.*							1			
GALLIA COUNTY—										
Gallipolis	1					1				
Addison *Tp.*					5					
Cheshire *Tp.*		10			4	1		1		
Harrison *Tp.*						3				1
Perry *Tp.*	1					1				
Raccoon *Tp.*	1					19				
Springfield *Tp.*		1	2	1						
GEAUGA COUNTY—										
Burton *Vil.*		5					13			
Chardon *Vil.*					1		2	2		1
Burton *Tp.*		1					1			
Chardon *Tp.*					2					
Huntsburg *Tp.*										1
Middlefield *Tp.*		2								
Montville *Tp.*								10		
Munson *Tp.*							1			
Thompson *Tp.*		1							2	
Newbury *Tp.*	1									
GREENE COUNTY—										
Xenia	4							10		
Fairfield *Vil.*								8		
Osborne *Vil.*								3		
Yellow Springs *Vil.*		1	1					2		
Bath *Tp.*								1		
Beaver Creek *Tp.*							11			1
Cedarville *Tp.*		1								
Jefferson *Tp.*		1								
Miami *Tp.*					4					
New Jasper *Tp.*		2								
Spring Valley *Tp.*										1
Sugar Creek *Tp.*					2					
Xenia *Tp.*				1						
GUERNSEY COUNTY—										
Cambridge		1	1	8	2		6	1		
Byesville *Vil.*							1			
Jefferson *Tp.*							4			
Monroe *Tp.*							5			
Valley *Tp.*	1						1			
Wheeling *Tp.*							2			

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
HAMILTON COUNTY—										
Cincinnati	152		19	40	24	130	28	62	6	112
Norwood	1			2		10	2	14		67
St. Bernard							2			
Arlington Heights *Vil.*							1			
Cheviot *Vil.*									1	4
Cleves *Vil.*						1				1
Elmwood Place *Vil.*									1	
Glendale *Vil.*	1									2
Lockland *Vil.*							1			12
Madeira *Vil.*								2		
Reading *Vil.*	1						2			1
Wyoming *Vil.*										1
Springfield *Tp.*							3		1	
Sycamore *Tp.*	1		1							1
Symmes *Tp.*										2
Whitewater *Tp.*		1			3					1
HANCOCK COUNTY—										
Findlay	4			2		6	3	1		
Arlington *Vil.*							1			
Mt. Blanchard *Vil.*							1			
Rawson *Vil.*								6		
Allen *Tp.*							1			
Amanda *Tp.*							1			
Big Lick *Tp.*					10					
Blanchard *Tp.*			1					1		
Delaware *Tp.*						1		1		
Jackson *Tp.*							1			
Washington *Tp.*	1									
HARDIN COUNTY—										
Kenton	1	1							1	
Ada *Vil.*									1	
Alger *Vil.*										5
Forest *Vil.*									3	
McGuffey *Vil.*	1					8				12
Mt. Victory *Vil.*							3			
Cessna *Tp.*								6	4	
Dudley *Tp.*	3				3					
Lynn *Tp.*									1	
McDonald *Tp.*									14	
HARRISON COUNTY—										
Cadiz *Vil.*			1							
Freeport *Vil.*				1						
Jewett *Vil.*		4								
Cadiz *Tp.*		18	1							
Freeport *Tp.*		1		1						
Stock *Tp.*		1								
HENRY COUNTY—										
Holgate *Vil.*							1			
Liberty Center *Vil.*						6				
McClure *Vil.*							1			
Marion *Tp.*						30				
Monroe *Tp.*										5
Pleasant *Tp.*		1				8	6			2
Washington *Tp.*						29				
HIGHLAND COUNTY—										
Greenfield *Vil.*					10		1			
Clay *Tp.*		1								
Paint *Tp.*		1			20					
HOCKING COUNTY—										
Logan *Vil.*						32	1			
Falls *Tp.*						4				
Green *Tp.*						6				
Starr *Tp.*						6				
Ward *Tp.*	1					4				

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
HOLMES COUNTY—										
Millersburg *Vil.*							2			
Berlin *Tp.*				2						
Hardy *Tp.*							2			
Monroe *Tp.*		2								
Salt Creek *Tp.*				8						
Walnut Creek *Tp.*							1			
HURON COUNTY—										
Bellevue					1	5	3	1		
Norwalk	1					20				
Chicago Junction *Vil.*	2					16				4
Monroeville *Vil.*	1	5					1			
Bronson *Tp.*						6				
Fairfield *Tp.*										2
Greenfield *Tp.*						5				
Greenwich *Tp.*										1
Norwich *Tp.*						23				
Richmond *Tp.*						6				2
Ripley *Tp.*						3				
Townsend *Tp.*		1								
Wakeman *Tp.*						5				
JACKSON COUNTY—										
Wellston				2						
Oak Hill *Vil.*									3	
Franklin *Tp.*										5
Jefferson *Tp.*							2		21	
JEFFERSON COUNTY—										
Steubenville	1		1	4				2		
Amsterdam *Vil.*	1							3		
Richmond *Vil.*	1									
Toronto *Vil.*	1									
Stratton *Vil.*		1								
Brush Creek *Tp.*		2								
Cross Creek *Tp.*										1
Island Creek *Tp.*	1		1							
Salem *Tp.*							1			
Saline *Tp.*							5	1		
Springfield *Tp.*									2	
Wells *Tp.*		2								19
KNOX COUNTY—										
Mt. Vernon	1					4				
Brinkhaven *Vil.*						3				
Centerburg *Vil.*						6				
Milford *Tp.*							1			
Miller *Tp.*		1								
Monroe *Tp.*							1			
Morris *Tp.*					3					
Pleasant *Tp.*						1				
Union *Tp.*						4				
LAKE COUNTY—										
Painesville						1	2		1	
Painesville *Tp.*									1	
Willoughby *Tp.*				2						
LAWRENCE COUNTY—										
Ironton	2	2	5	2		94		3		1
Chesapeake *Vil.*		4								
Coal Grove *Vil.*						9				
Proctorville *Vil.*						1				
South Point *Vil.*		1								
Aid *Tp.*						1				
Hamilton *Tp.*				1						
Upper *Tp.*						1				
Washington *Tp.*									8	9

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
LICKING COUNTY—										
Newark	3	3	3		1	8	1	7		
Hartford *Vil.*										2
Hebron *Vil.*								10		
Kirkersville *Vil.*					5					
Etna *Tp.*				2		9				
Harrison *Tp.*					2					
Hartford *Tp.*						1				3
Lima *Tp.*		1								
Madison *Tp.*	1						1			
Union *Tp.*					10	3		13		3
LOGAN COUNTY—										
Bellefontaine	1	2						23		
Belle Center *Vil.*								5		
Quincy *Vil.*								6		
Rushsylvania *Vil.*									2	
West Liberty *Vil.*						1				
Bokes Creek *Tp.*		1							1	
Lake *Tp.*									1	
Liberty *Tp.*		1		1						
McArthur *Tp.*		1								
Monroe *Tp.*								2		
Richland *Tp.*				2		1				
Rush Creek *Tp.*								1	39	
Zane *Tp.*	2	3				4	2	2		
LORAIN COUNTY—										
Elyria	1				1	61	2			9
Lorain	1	1		10		4		8	1	
Amherst *Vil.*				1						
Oberlin *Vil.*			1			12		1		2
Wellington *Vil.*						2				
Avon Lake *Tp.*						1				
Brownhelm *Tp.*			1			8				
Carlisle *Tp.*						3		2		
Columbia *Tp.*									1	1
Eaton *Tp.*						5		3		
Grafton *Tp.*					2	5		2		
Ridgeville *Tp.*						3				
Sheffield *Tp.*						1			1	
LUCAS COUNTY—										
Toledo	99		29	19	56	100	27	101	5	9
Whitehouse *Vil.*				1						
Adams *Tp.*				1			6			
Oregon *Tp.*						4				
Providence *Tp.*						3				
Washington *Tp.*					4	68	1	1	5	
MADISON COUNTY—										
London							2			
Mt. Sterling *Vil.*	1				1					
Plain City *Vil.*	2									
West Jefferson *Vil.*				1						
MAHONING COUNTY—										
Youngstown	12	20	4	14	2	6	14	9		17
Canfield *Vil.*										4
East Youngstown *Vil.*	3	3		2		1	2	2		
Lowellville *Vil.*				1			1			
Poland *Vil.*										6
Sebring *Vil.*		1	1		3	1		4		
Austintown *Tp.*					1					3
Boardman *Tp.*		2		1						30
Coitsville *Tp.*		1								
Ellsworth *Tp.*						1				1
Goshen *Tp.*						9				1

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
MAHONING COUNTY—Concluded.										
Green *Tp.*								15		1
Poland *Tp.*						1				
Smith *Tp.*				1						
Springfield *Tp.*						1				
MARION COUNTY—										
Marion		1				2	8	2	1	
Caledonia *Vil.*						1				
Larue *Vil.*	1								4	
Morral *Vil.*									1	
Big Island *Tp.*						4				
Bowling Green *Tp.*							8		4	
Marion *Tp.*				1						
Montgomery *Tp.*									2	
Pleasant *Tp.*						2				
Scott *Tp.*		1								
Tully *Tp.*						1				
Waldo *Tp.*						1				
MEDINA COUNTY—										
Seville *Vil.*	2			1						
Wadsworth *Vil.*						1	1			
Brunswick *Tp.*		1	1							
Granger *Tp.*			1							
Hinckley *Tp.*		1				1	5			
Lafayette *Tp.*			1							
Litchfield *Tp.*						1				
Liverpool *Tp.*					7	47	1	7		
Sharon *Tp.*						4				
York *Tp.*						4				
MEIGS COUNTY—										
Middleport *Vil.*		1				1				
Bedford *Tp.*						6	1			
Lebanon *Tp.*			1							
Orange *Tp.*		2								
Salem *Tp.*		2								
Scipio *Tp.*						15				
Sutton *Tp.*					1	1		4		
MERCER COUNTY—										
Celina *Vil.*				2		1	8			
Coldwater *Vil.*				4						
Montezuma *Vil.*							1			
Rockford *Vil.*							2		4	
St. Henry *Vil.*		1								
Black Creek *Tp.*							2			
Butler *Tp.*			1	1						
Center *Tp.*							1			
Franklin *Tp.*							6			
Gibson *Tp.*		1					2			
Granville *Tp.*		2					4			
Jefferson *Tp,*				1						
Recovery *Tp.*		1								
Union *Tp.*					2					
MIAMI COUNTY—										
Piqua	2	7	1		2	1				6
Troy						2	3			4
Casstown *Vil.*										2
Covington *Vil.*								2		
Fletcher *Vil.*							1			
Laura *Vil.*					6					
Tippecanoe City *Vil.*						1				
Brown *Tp.*							7			2
Lost Creek *Tp.*	1									4
Spring Creek *Tp.*										2
Washington *Tp.*		1								

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
MONROE COUNTY—										
Malaga *Tp.*		3								
Ohio *Tp.*	1	1								
Summit *Tp.*		1								
Sunsbury *Tp.*							1			
MONTGOMERY COUNTY—										
Dayton	27	32	15	18	45	118	63	72		14
Brookville *Vil.*						1	1			
Farmersville *Vil.*					2					
Germantown *Vil.*						59		3		1
Miamisburg *Vil.*						2		10		1
Vandalia *Vil.*							3			
Butler *Tp.*				1	12					
Harrison *Tp.*						5	6			
Jackson *Tp.*					3	5	5			
Jefferson *Tp.*	1	1								
Mad River *Tp.*			1							
Perry *Tp.*	3	2			6	5	1			
Van Buren *Tp.*	1	1		2				1		
Wayne *Tp.*										2
MORGAN COUNTY—										
Stockport *Vil.*	1									
MORROW COUNTY—										
Sparta *Vil.*		1				1				
Bennington *Tp.*				2						
North Bloomfield *Tp.*							1			
South Bloomfield *Tp.*		1				10				
MUSKINGUM COUNTY—										
Zanesville	10	1	3	2	6	1	1	1		8
Blue Rock *Tp.*		1								
Jackson *Tp.*										3
Newton *Tp.*	1									
Washington *Tp.*								1		
Wayne *Tp.*										5
NOBLE COUNTY—										
Caldwell *Vil.*		1						1		
Beaver *Tp.*			1							
Jefferson *Tp.*										4
Sharon *Tp.*							1			4
OTTAWA COUNTY—										
Port Clinton *Vil.*						1	1		7	1
Allen *Tp.*							1			
Benton *Tp.*							3			
Clay *Tp.*							1			
Danbury *Tp.*										1
Erie *Tp.*										2
PAULDING COUNTY—										
Antwerp *Vil.*					1					1
Cecil *Vil.*							1			
Paulding *Vil.*						7				
Auglaize *Tp.*						4	4			
Carryall *Tp.*					5					6
Emerald *Tp.*						4			1	
Jackson *Tp.*						1			7	
Latty *Tp.*						1				
Washington *Tp.*	1								1	
PERRY COUNTY—										
Corning *Vil.*								3		
Crooksville *Vil.*		1								
Hemlock *Vil.*				2						
New Straitsville *Vil.*		1								
Rendville *Vil.*		1								
Shawnee *Vil.*		2		1						

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.		Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
PERRY COUNTY—Concluded.											
Coal	Tp.						1				
Monday Creek	Tp.	1								7	
Monroe	Tp.								6		
Thorn	Tp.		1	1							
PICKAWAY COUNTY—											
Circleville		1	1								
Jackson	Tp.		1								
Pickaway	Tp.							1			
Walnut	Tp.						2				
PIKE COUNTY—											
Beaver	Tp.		1								
Jackson	Tp.			1							
Mifflin	Tp.		1								
Newton	Tp.								4		
Pebble	Tp.		1						4		4
Perry	Tp.		2								
Scioto	Tp.				1						
PORTAGE COUNTY—											
Ravenna								2			
Hiram	Vil.		3								
Kent	Vil.				2			2			
Atwater	Tp.								1		
Brimfield	Tp.			1							
Deerfield	Tp.										2
Franklin	Tp.		1								
Hiram	Tp.		1								
Randolph	Tp.								10		
Ravenna	Tp.				1			1			
Rootstown	Tp.							1			
PREBLE COUNTY—											
Camden	Vil.	1									
Eaton	Vil.			1	3						
Lewisburg	Vil.				1						
New Paris	Vil.								6		
Verona	Vil.						1				
Dixon	Tp.					2		1			
Jackson	Tp.		1		1	4					1
Somers	Tp.					6					
PUTNAM COUNTY—											
Columbus Grove	Vil.	1	1				5				
Continental	Vil.									20	
Cloverdale	Vil.								1		
Dupont	Vil.						3				
Glandorf	Vil.								1		
Miller City	Vil.		1			7					
Ottawa	Vil.						1				
Pandora	Vil.						60				
West Leipsic	Vil.					6					
Blanchard	Tp.		1								
Liberty	Tp.							6			
Monterey	Tp.		1	2				1		4	
Ottawa	Tp.							2			
Palmer	Tp.		1								
Pleasant	Tp.						5				
Riley	Tp.		1		1		17				
Sugar Creek	Tp.						5				
Union	Tp.		2				5				
Van Buren	Tp.									1	
RICHLAND COUNTY—											
Mansfield		4		1		1	2		9		1
Lexington	Vil.								1		
Plymouth	Vil.		2								

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
RICHLAND COUNTY—Concluded.										
Shelby Vil.				1		27	1	1		
Blooming Grove Tp.						2				
Cass Tp.		1								
Jackson Tp.						5				
Sharon Tp.						5				
Springfield Tp.		1								
ROSS COUNTY—										
Chillicothe	2	9				6		2		
South Salem Vil.										3
Franklin Tp.						10				
Jefferson Tp.										2
Liberty Tp.						3				
Paint Tp.		1								
Scioto Tp.								5		1
SANDUSKY COUNTY—										
Fremont		2		1		3	2	8		
Clyde Vil.	1									
Woodville Vil.									1	
Green Creek Tp.							2			
Madison Tp.					1					2
Rice Tp.			1							
Sandusky Tp.				3						
SCIOTO COUNTY—										
Portsmouth	1		1				4			
New Boston Vil.	1	3			4	2				
South Webster Vil.		1								2
Bloom Tp.		1					1		21	
Green Tp.	1									
Madison Tp.						1	2			
Nile Tp.	1									
Porter Tp.	1									
Union Tp.				1						
Vernon Tp.		8				1				
SENECA COUNTY—										
Fostoria					2	1		1	2	
Tiffin								1		
Attica Vil.		1			6	1				
Adams Tp.	1						2			
Eden Tp.					10					
Hopewell Tp.									1	
Jackson Tp.					1				2	
Liberty Tp.						6				
Loudon Tp.									1	
Pleasant Tp.	1					2				
Thompson Tp.						3	3			
Venice Tp.		3			6	3				
SHELBY COUNTY—										
Kettlersville Vil.								5		
Clinton Tp.							1			
Franklin Tp.							2			
Green Tp.	1									
Washington Tp.		1								
STARK COUNTY—										
Alliance	4	12		7	2		4			2
Canton	7	2		3	3	24	47	12	15	7
Massillon				3		21	4			
Minerva Vil.							1	1		
Canton Tp.							1		1	
Jackson Tp.									1	
Lawrence Tp.							2			
Marlboro Tp.							1			
Paris Tp.							1			

COMMUNICABLE DISEASES, APRIL, 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
STARK COUNTY—Concluded.										
Perry Tp.						2				
Pike Tp.									4	
Plain Tp.	1	1					3			
Sugar Creek Tp.		1	1		1	5				2
Tuscarawas Tp.	1				6					
SUMMIT COUNTY—										
Akron	3		5	28		8	38	19	8	1
Barberton				1			2			
Cuyahoga Falls Vil.	2		3			1	1	1		1
Kenmore Vil.							1			
Portage Tp.	1							2	4	
Springfield Tp.				1			1			
Tallmadge Tp.							11			
Twinsburg Tp.			1			31				
TRUMBULL COUNTY—										
Niles	6	1	1					1		2
Warren		2				4		2		6
Girard Vil.	2		2							
Orangeville Vil.	1							1		
West Farmington Vil.										1
Bloomfield Tp.		1								
Bristol Tp.		2				1				
Greene Tp.			1							
Howland Tp.							1			
Hubbard Tp.	1	2								8
Johnston Tp.	1						2			
Liberty Tp.							1			
Lordstown Tp.								10		
Mecca Tp.		1								
Mesopotamia Tp.										5
Southington Tp.							7			
Vienna Tp.				1						
TUSCARAWAS COUNTY—										
Canal Dover	1			1			3		1	
New Philadelphia							1		1	
Dennison Vil.				1						
Strasburg Vil.	1									
Sugar Creek Vil.									9	
Auburn Tp.							1			
Fairfield Tp.					1		1			
Goshen Tp.				1						
Mill Tp.				1						
Sandy Tp.								2		
Sugar Creek Tp.									5	
UNION COUNTY—										
Marysville Vil.							1	2		
Allen Tp.							1	13		
Jackson Tp.							4	1		
Leesburg Tp.					8					
Liberty Tp.							1		4	
Washington Tp.							3			
VAN WERT COUNTY—										
Convoy Vil.							4			
Ohio City Vil.		3				81				
Wren Vil.						2				
Harrison Tp.						12	2			14
Jackson Tp.									1	
Jennings Tp.							1			
Liberty Tp.		2				96		1		
Tully Tp.							2			
Washington Tp.			1							
Willshire Tp.						4				

COMMUNICABLE DISEASES, APRIL, 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.		Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
VINTON COUNTY—											
McArthur	*Vil.*				1						
Wilkesville	*Vil.*						2				
Zaleski	*Vil.*					3					
Brown	*Tp.*						5				
Eagle	*Tp.*	1									
Knox	*Tp.*					5					
Vinton	*Tp.*						5				
WARREN COUNTY—											
Butlerville	*Vil.*										2
Harveysburg	*Vil.*										5
Lebanon	*Vil.*	1			7				1		24
South Lebanon	*Vil.*										10
Waynesville	*Vil.*						1				1
Clear Creek	*Tp.*						11				11
Deerfield	*Tp.*								10		
Franklin	*Tp.*								4		
Union	*Tp.*			1	1						8
Wayne	*Tp.*					2	20		1		5
WASHINGTON COUNTY—											
Marietta		2							3		
Belpre	*Vil.*						1				1
New Matamoras	*Vil.*		4	1							
Belpre	*Tp.*						6				
Liberty	*Tp.*				1						
Muskingum	*Tp.*						3				2
Warren	*Tp.*										3
WAYNE COUNTY—											
Doylestown	*Vil.*						36				
Rittman	*Vil.*						11				
Shreve	*Vil.*			1					1		
Baughman	*Tp.*						14				
Chippewa	*Tp.*						21		4		
Greene	*Tp.*						7				
Wooster	*Tp.*							2			
WILLIAMS COUNTY—											
Montpelier	*Vil.*					1			14	8	
Pioneer	*Vil.*					1	19				
Stryker	*Vil.*						1				
Bridgewater	*Tp.*						3				
Madison	*Tp.*					4	7				
Northwest	*Tp.*					4	19				
Superior	*Tp.*								1		
WOOD COUNTY—											
Bowling Green					1						
Custar	*Vil.*						1				
Grand Rapids	*Vil.*						4				
Perrysburg	*Vil.*		1				4	4	2		
Portage	*Vil.*		1								
West Milgrove	*Vil.*		1								
Weston	*Vil.*		1								
Walbridge	*Vil.*					1					
Liberty	*Tp.*							4			
Middleton	*Tp.*				2						
Plain	*Tp.*							1			
Ross	*Tp.*		1						1		
Weston	*Tp.*		1								
WYANDOT COUNTY—											
Carey	*Vil.*						2			1	
Sycamore	*Vil.*				1						
Harpster	*Vil.*	1									
Upper Sandusky	*Vil.*		1						1		

COMMUNICABLE DISEASES, APRIL, 1915—Concluded.

This table records cases of specified diseases reported to the State Board of Health for the month of April, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
WYANDOT COUNTY—Concluded.										
Antrim *Tp.*									3	
Crane *Tp.*		1				1				
Eden *Tp.*									2	
Pitt *Tp.*	1									
Tymochtee *Tp.*				1						

NUMBER AND DISTRIBUTION BY COUNTIES OF REPORTED CASES OF COMMUNICABLE DISEASES NOT INCLUDED IN THE GENERAL TABLE—APRIL, 1915.

County.	Gonorrhea.	Syphilis.	German Measles.	Epidemic Cerebro-spinal Meningitis.	Acute Anterior Poliomyelitis.	Ophthalmia Neonatorum.	Trachoma.	Other Notifiable Diseases.
Allen	3						1	*ab*2
Ashtabula	1	1	3					
Athens	8	7	5					
Belmont	3							
Brown			1					*c*2
Butler	9	3	1	1		1		
Clark			2				6	
Clermont	1		6					
Clinton	1							
Columbiana	2		3					
Cuyahoga	4	8	5	1	2	52	5	
Darke	2							
Defiance	1	1	4			1		
Erie	1						1	
Fairfield	6							
Franklin	3	2		1		4		*b*1
Fulton	2	2						
Geauga	2							
Greene	2							
Guernsey								*d*1
Hamilton	6	13	208	8		1	4	
Hardin	2					1	1	
Harrison		1						
Highland	4	1						
Hocking		2						
Jefferson	1	1		1				
Knox	1							
Lawrence		1	3			2	1	
Licking	4	2	1					
Logan	2	2						
Lorain	2		4			1	2	
Lucas	18	24				9	2	
Mahoning	8	4	8			3	9	*be*2
Marion				1				
Meigs			2					
Miami		1		1		1	1	
Montgomery	5		2				1	*f*4
Morrow	1	1						
Muskingum	1							*g*1
Ottawa						1		
Perry	1							
Pickaway					1			
Portage			81					
Putnam	3							
Richland	3	1						
Ross	3	6						
Sandusky	1	1	3					
Scioto				1				*b*1
Shelby	1							
Stark	1		22		1	1		
Summit		1		3	1	1		
Trumbull	2	1						
Tuscarawas	1	3						
Van Wert	1							
Warren	11	1	1		1			
Washington	1							
Wayne	2							
Williams	1							
Wood		1				1		

a Trichinosis. *b* Tetanus. *c* Septic Sore Throat. *d* Anthrax (Human). *e* Paratyphoid Fever. *f* Malaria. *g* Pellagra.

PUBLICATIONS OF THE OHIO STATE BOARD OF HEALTH.

Annual Reports.

1886, 87, 88, 89*, 90, 91, 92, 93, 94*, 95*, 96, 97, 98*, 99*, 1900, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12.

*Sanitary Record (Monthly), 1888 to 1894. Vol. 1 to Vol. 7.

*Ohio Sanitary Bulletin (Quarterly), 1895 to 1896. Vol. 1 and 2.

*Ohio Sanitary Bulletin (Monthly), 1897 to 1908. Vol. 1 to Vol. 12.

Quarterly Bulletin, Ohio State Board of Health, 1909 and 1910. Vol. 1 and 2.

Monthly Bulletin, Ohio State Board of Health, 1911, 12, 13, Vol. 1, 2, 3, (Volumes not complete).

Special Reports.

*Sources of Public Water Supplies of Ohio, Preliminary Reports.

Vols. 1-5. 1897 to 1902 inclusive.

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The Ohio Public Health Journal

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WATER PURIFICATION AT COLUMBUS.

CHARLES P. HOOVER, A. M.
Chemist-in-Charge Water Purification Plant, Columbus, Ohio.

There exists much misunderstanding, prejudice and mystery concerning the art of water purification. It is the object of this paper to describe in non-technical terms the operation of the Columbus Water Purification Plant, and to show that the chemically purified water is not "doped" with chemicals as is sometimes stated by those who do not understand the changes which take place in the chemical treatment of a public water supply.

Few cities have had so difficult a public water supply problem to solve as did the city of Columbus, Ohio. For years prior to the installation of the present plant, sewage-polluted water from Alum Creek and the Olentangy and Scioto Rivers was pumped into the distributing system of the city. Even with these three sources of supply the quantity of water available was not sufficient and there was constant danger during the summer and fall months of a water famine.

As has already been stated, the water was polluted with sewage, was at times extremely muddy and as the watersheds of the above mentioned streams are underlaid with limestone rock the water passing over and through this limestone was very hard. The hardness was so excessive that the water was not satisfactory for domestic or commercial uses. It would not lather freely with soap and when used for boiler feed purposes was very injurious to the boilers due to the large amount of scale deposited on the boiler tubes. The water was so impure that severe epidemics of typhoid fever were of frequent occurrence, and Columbus was recognized as having perhaps as high a typhoid fever death rate as any large city in the United States. In 1904, just a year previous to the time work was started on the improved water supply, the typhoid fever death rate was 139 per 100,000, a disgrace to any American city.

After heavy rains the water was so turbid or muddy that it was almost impossible to use it for domestic or other purposes. The reader will perhaps realize how muddy the water really was by knowing that now after heavy rains as much as 250,000 pounds of mud are removed from a single day's supply of water.

In order to provide a sufficient quantity of water a dam was built across the Scioto River about five miles above the city. This dam is a concrete structure, approximately 1,000 feet long, and 30 feet high. The reservoir formed by the construction of this dam is 5.8 miles long, has an average width of 500 feet, and has a capacity of 1,720,000,000 gallons. The dam is located about 4.5 miles from the purifying and softening works. It was originally planned to build a gravity conduit from the dam to the purification works, but no money was appropriated for this work, therefore, the bed of the river carries the water from the dam to the pumping station. The water is pumped from the river to the purification works and there is softened and filtered. The reservoir and dam cost $640,200.

Storage Dam and Reservoir.

Lime and soda ash are used to soften the water and alum (sulphate of alumina) is used as a coagulant.

During the year 1914 the total hardness of the river water averaged 297 parts per million, whereas, the total hardness of the filtered water was only 79 parts per million. The effluent from the water purification plant was, therefore, sufficiently soft so that it was entirely satisfactory for domestic and commercial purposes.

The water as now delivered to the consumer is sparkling clear, has a wholesome taste, and is at all times free from disease producing bacteria. During the year 1914 the average number of bacteria present in the raw river water was 6,331 per cubic centimeter, and the average number in the filtered water was only 14 per cubic centimeter, a reduction of 99.8 per cent. Another evidence of the purity of the water is the decrease in the typhoid fever death rate since the plant was put in operation. There were 28 deaths from typhoid fever

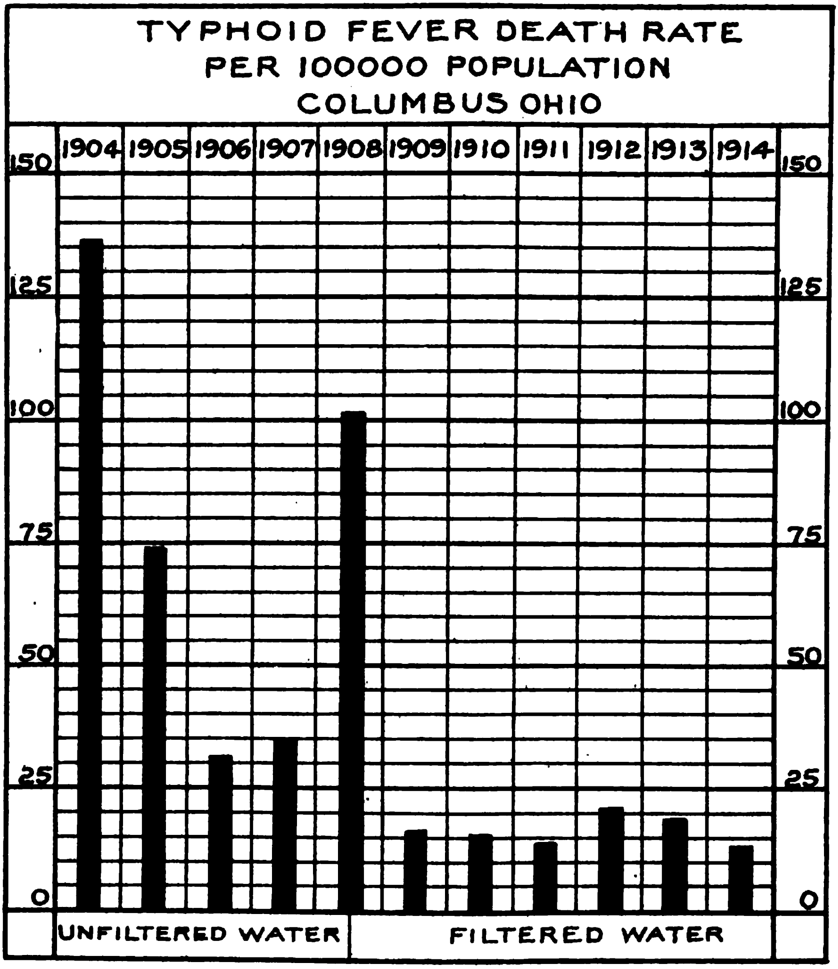


Diagram Showing Relation between the Public Water Supply and the Typhoid Fever Death Rates in the City of Columbus. Filter Plant was put in Operation in Sept. 1908.

Diagram No. 1.

during the year 1914, a rate of 13.7 per 100,000, calculating the city's population at 204,567.

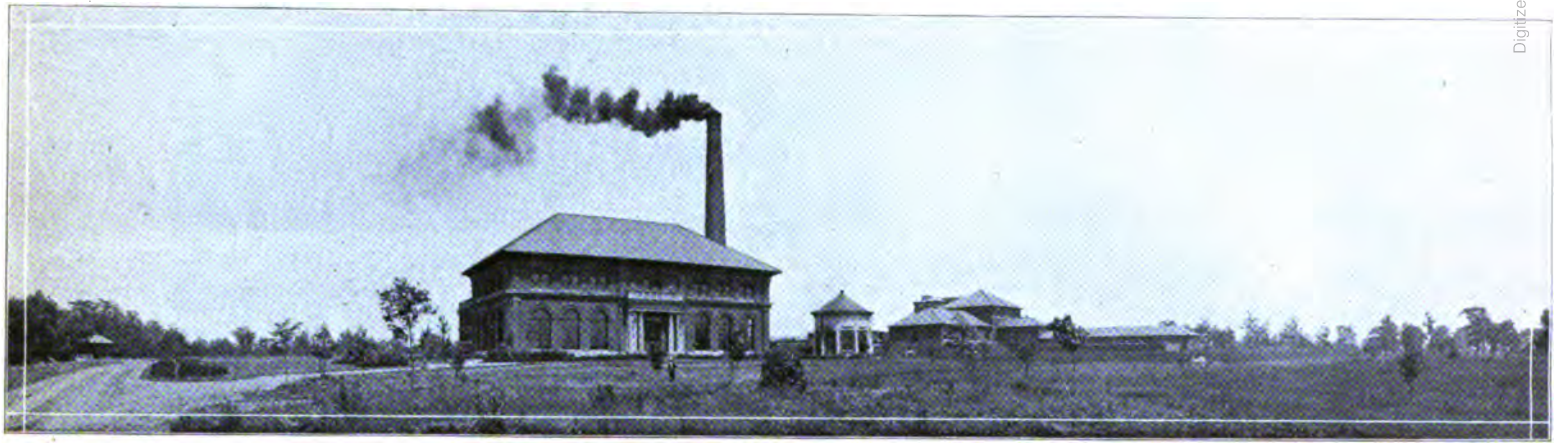
Diagram No. 1 shows the relation between the public water supply and the typhoid fever death rates in the city of Columbus.

The city maintains a complete chemical and bacteriological laboratory at the water purification plant, where the water is tested chemically every two hours day and night, Sunday and holidays, and bacterial analyses are made daily on samples collected at the plant and from different points on the distributing system. Daily bacteriological tests are also made in the laboratory of the Ohio State Board of Health and at the city board of health. There is a chemist to control the operation of the plant and attendants for plant operation on duty every hour of the day and night.

Every day during the year 1914 the water softening and purification plant softened and purified an average of 18,400,000 gallons of water. This was sufficient for a per capita consumption of 88 gallons per day. The expenditure for chemicals for treating the water during 1914 was $83,826, divided as follows:

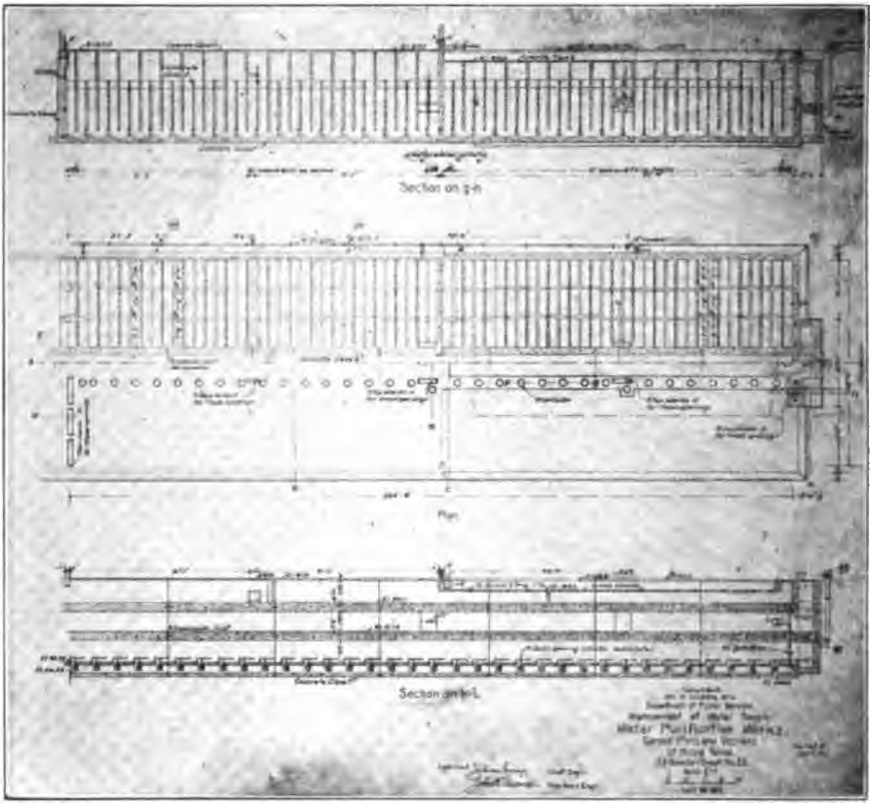
Lime, 4,650 tons at average of $5.27 per ton.
Soda ash, 3,540 tons at average of $13.30 per ton.
Alum, 880 tons at average of $16.75 per ton.

When the Columbus plant was placed in service consumers felt that the use of chemicals for the softening and purifying process would not be desirable, and consequently had some hesitancy in using the chemically treated water. This prejudice has now been almost entirely overcome and the citizens of Columbus are beginning to realize that the water is not "doped" with chemicals but that there is less mineral matter or chemicals in the softened and purified water than there is in the raw river water. The chemicals which are added in order to soften and purify the water combine with the soluble mineral salts already present in the raw water and new compounds are formed. These new chemical compounds which are formed are different from those originally present and are also different from the chemicals added in that the chemical added to the water and the mineral salts present in the raw water are soluble, whereas, these new compounds which are formed are not soluble and consequently are easily removed from the treated water. The chemicals added as well as the mineral salts already present are removed by the purification process and, therefore, as has been already stated there is less chemical or mineral content present in the softened and filtered water than in the raw Scioto River water.



Water Purification Plant.

The raw Scioto River water which passes either over the dam or through large gates which are provided in the dam, passes down the channel of the river to the intake at the purification works. The intake is protected by means of large screens which serve to prevent the entrance of sticks, leaves, or other floating particles which would seriously damage the pumps should they be drawn in the suction line. The water passing the screens enters a suction well from which it is lifted by a pump and forced through a meter into the receiving compartment at the purification plant. Chemical solutions, lime, soda ash and alum of known strength or concentration are prepared and stored in large chemical solution tanks. Proper quantities of these chemical solutions for softening and purifying the water are measured by special measuring devices and discharged into the water as it enters the receiving compartment. After the addition of the chemical solutions



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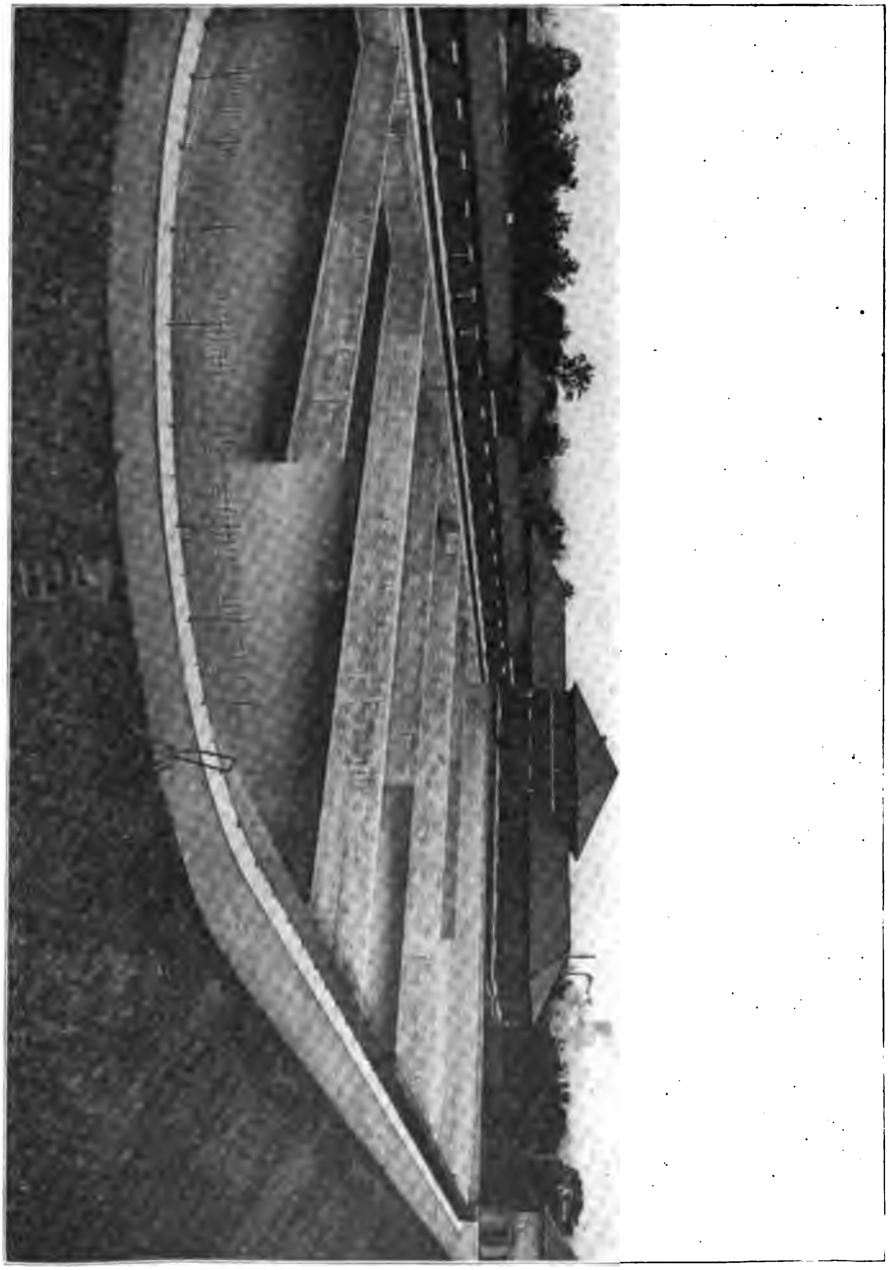

NUMBER 2.

it is very necessary that the chemicals and water be thoroughly mixed. This mixing is accomplished by passing the water through baffled mixing chambers, illustration No. 1. The mixing chambers may be described as a series of dams over and under which the water is made to pass. At the Columbus plant the water travels approximately one mile over and under these dams in a period of about two hours. During the time the water is passing through this mixing chamber the chemical reactions between the chemicals added to the water and the minerals salts originally present take place. The precipitate is insoluble material formed by these reactions and is a heavy gelatinous mass. It entangles itself with the mud, bacteria, and other impurities in the water. This mixture is heavy and is easily removed. Much is removed by allowing the water to circulate slowly through large settling basins. See illustration No. 2. The heavy gelatinous mass settles to the bottom of these basins or tanks from which it is periodically washed into the river at a point below the intake. The water from the top of the basins is drawn off continuously and filtered through sand beds into a large receiving basin or filtered water reservoir. See illustration No. 3.

NUMBER 3.

The filter is a concrete box in the bottom of which is a strainer system. The strainer system consists of a number of small brass plates perforated with small holes. The strainers are covered with gravel which is placed in four layers graded in size, the coarsest being at the bottom. The gravel supports the sand which has a thickness of 30 inches. When a filter bed is in service, that is, when the water is filtering through it the water passes downward through the sand. All the mud, impurities, suspended particles and practically all of the bacteria are caught or retained on the surface of the sand bed, and the water coming from the filter is sparkling, clear and pure. After a filter has been in service 24 or 48 hours it becomes necessary to clean the bed and this is done by forcing the water upwards through the strainer system. The water comes up through the openings in the strainer plates, up through the gravel and sand, and the mud and impurities on the surface of the bed, being lighter than the sand, are floated in the rising wash water and are overflowed into a drain and are allowed to flow back into the river. The entire filter bed having an area of 1,080 square feet is washed perfectly clean in five minutes.

Appended to this paper will be found the monthly averages of operating results for the Columbus water purification plant since it was started in operation. The methods of analysis of both the routine chemical and bacteriological work are given in the next few pages. Information concerning specifications upon which the chemicals are purchased may also be found.

METHODS OF ANALYSIS USED AT THE COLUMBUS WATER SOFTENING AND PURIFICATION PLANT.

Many of the time-consuming analytical determinations which are made daily at many water purification plants have been eliminated at the Columbus water softening and purification plant because we believe that only such tests as give assurance of the purity of the water and assist in properly treating the water should be made a part of the routine schedule, and that such tests as nitrogen, as free and albuminoid ammonia, nitrates and nitrites, and the determination of dissolved oxygen, oxygen consumed, and complete mineral analysis serve to advantage only in special cases.

The analytical data necessary to determine approximate quantities of lime and soda ash required to soften a hard magnesium water, such as the Scioto River water, are:

Free CO_2.
Half bound CO_2 (44% of the alkalinity).
Half bound CO_2 (44% of the alkalinity).
Total magnesium.

The alkalinity hardness of natural waters ordinarily includes the carbonates and bicarbonates of calcium and magnesium, and is usually referred to as temporary hardness, and this hardness is reduced by lime treatment. The alkalinity of some western waters includes carbonates of sodium or potassium, and softened waters if they are over-treated with lime or soda ash will contain alkalinity due to the presence of calcium hydrate and sodium carbonate.

By incrustant hardness is meant the sulphates, chlorides, and nitrates of calcium and magnesium. This hardness is removed by soda-ash treatment.

The sum of alkalinity hardness and incrustant hardness equals total hardness.

LIME APPLICATION.

When lime is added to a hard magnesium water, such as the Scioto River water, its action is twofold. It neutralizes the free and half-bound carbonic acid and precipitates the magnesium to the insoluble hydrate form. Its action on the incrusting (sulphate, chloride and nitrate) magnesium, results in the formation of an equivalent amount of calcium incrustant. When lime is added to water containing only calcium salts, it is necessary to apply only sufficient lime to neutralize the free and half-bound carbonic acid. The quantity of lime required to soften a hard magnesium water is that quantity required to neutralize the carbonic acid, together with the additional quantity required to convert into hydrate form the total amount of magnesium present.

Reactions which take place when lime is added to a hard magnesium water:

$$\begin{aligned} &CaCO_3\,CO_2 + Ca(OH)_2 = 2CaCO_3 + H_2O \\ &MgCO_3\,CO_2 + Ca(OH)_2 = MgCO_3 + CaCO_3\,H_2O \\ &MgCO_3 + Ca(OH)_2 = Mg(OH)_2 + CaCO_3 \\ &CO_2 + Ca(OH)_2 = CaCO_3 + H_2O \\ &MgSO_4 + Ca(OH)_2 = Mg(OH)_2 + CaSO_4 \end{aligned}$$

Reactions which take place when soda ash is added to a hard magnesium water along with lime:

$$\begin{aligned} &MgSO_4 + Na_2CO_3 + Ca(OH)_2 = Mg(OH)_2 + CaCO_3 + Na_2SO_4 \\ &CaSO_4 + Na_2CO_3 = CaCO_3 + Na_2SO_4 \end{aligned}$$

Methods of Analysis.

Free carbonic acid is determined as follows:

Procedure — Measure 10 cc. of the sample into a tall narrow vessel, preferably a 100 cc. Nessler tube, and titrate rapidly with the N/22 sodium carbonate solution, stirring gently until a faint but permanent pink color is produced by phenolphthalein.

The number of cc. of the N/22 sodium carbonate solution used in titrating 100 cc. of the water, multiplied by 10, gives the parts per million of free carbonic acid as CO_2.

Half Bound $CO_2 = .44$ times the total alkalinity.

Incrustants are determined as follows:

Procedure — Measure 200 cc. of the water into a Jena glass Erlenmeyer flask; boil 10 minutes to expel free carbonic acid, and add 25 cc. N/10 "soda reagent" (equal parts of $Na\,OH$ and $Na_2\,CO_3$). Boil to a volume of 100 cc., cool, rinse into a 200 cc. graduated flask and make up to 200 cc. with boiled distilled water. Filter, rejecting the first 50 cc. and titrate 100 cc. of the filtrate for excess of soda reagent, using N/20 sulphuric acid and erythrosine as an indicator.

If S — N/20 cc. $H_2\,SO_4$ equivalent to soda reagent used, and N = cc. N/20 $H_2\,S\,O_4$ required for the excess (back titration), then the non-carbonate hardness in parts per million of calcium carbonate equals 12.5 (S — 2N).

Total Magnesium.

Measure 100 cc. of the sample into a 200 cc. graduated Jena volumetric flask, boil gently to about 50 cc., add 25 cc. of the saturated lime water, make up to 205 cc. mark with boiling distilled water.

Place on steam bath for 15 minutes, stopper and cool, volume should shrink by cooling to 200 cc. graduation mark on flask.

Let stand until precipitate completely settles, pipette off 50 cc. of solution into a tall Nessler tube and titrate with N/50 $H_2\,SO_4$ using Phenolphthalein as indicator.

If S— represents the number of cc. of N/50 $H_2\,SO_4$ required to neutralize 25 cc. of the lime water and N of the number of cc. of the same acid required to neutralize the excess lime water in the sample then Mg in parts per million equals 2.4 (S — 4N).

As the strength of the lime water solution varies with temperature a control determination should be made by treating the specified quantity of lime water with distilled water in the same manner as in the regular procedure.

After having made the above determination apply the following factors in order to determine approximately the quantities of lime and soda ash necessary to soften the water.

Lime Required (Grains Ca O Per Gallon).

The sum of free and half-bound CO_2 (expressed as parts per million) multiplied by .074 = grains of lime per gallon necessary to absorb free and half-bound CO_2.

Total Magnesium (expressed as parts per million) multiplied by .136 = grains of lime necessary to precipitate magnesium.

Soda ash required (grains $Na_2 CO_3$ per gallon).

Incrustants expressed as parts per million* multiplied by .062 = grains per gallon of $Na_2 CO_3$ required.

Under ordinary operating conditions, in softening water with lime, care should be exercised in order to reduce the temporary hardness to the lowest possible figure, and still not leave residual or excess lime in the softened water.

The following tests should be made in order to guard against over or under treatment with lime.

I. Total alkalinity.
II. Alkalinity to phenolphthalein.

Methods of Aanlysis.

Total alkalinity is determined as follows:

Measure 100 c.c. water into a 250 c.c. white glass stopper bottle with 2.5 c.c. erythrosine solution (0.1 gram of sodium salt in one liter distilled water) add 5 c.c. chloroform.

Sulphuric acid (N/50) is added in small quantities, shaking the bottle vigorously after each addition of the acid. The rose color gradually disappears and is finally discharged entirely by a drop or two of the acid. The number of c. c. of N/50 sulphuric acid used when multiplied by 10 gives the number of parts per million of alkalinity in terms of calcium carbonate.

Alkalinity to Phenolphthalein:

Measure 10 c.c. of the sample into a tall narrow vessel, preferably a 100 c.c. Nessler tube, add 2 drops of phenolphthalein solution and tirate rapidly with N/50 $H_2 SO_4$, stirring gently until the red color completely disappears.

The number of c.c. N/50 $H_2 SO_4$ used in titrating 100 c.c. of water, multiplied by 10, gives the parts per million "phenolphthalein alkalinity" in terms of calcium carbonate.

If the alkalinity to phenolphthalein is more than one-half of the total alkalinity, too much lime has been added, and the water will contain caustic alkalinity. On the other hand if the phenolphthalein alkalinity is less than one-half of the total alkalinity not enough lime has been added and the water contains bicarbonate alkalinity.

The ideally lime softened water should contain neither caustic alkalinity nor bicarbonate alkalinity. The following table shows the reaction between alkalinity by phenolphthalein, and by erythrosine in the presence of bicarbonates, normal carbonates and hydrates.

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* Minus that quantity of incrustants it is desired to leave in the water.

RESULTS EXPRESSED AS PARTS PER MILLION.

Sample No.	Suppose the alkalinity to methyl-orange or erythrosine to be	And the alkalinity to phenolphthalein to be	Then the analysis would show		
			Bicarbonates	Normal Carbonates.	Excess lime or Causticity.
1	44	0	44	0	0
2	44	20	4	40	0
3	44	22	0	44	0
4	44	24	0	40	4

Sample No. 1.	Contains no lime.
Sample No. 2.	Contains too small quantity of lime.
Sample No. 3.	Contains exactly correct quantity of lime.
Sample No. 4.	Contains too much lime.

During the past five years the average alkalinity of the Scioto River water at Columbus has been reduced from 153 parts per million to 48 parts per million, and the average caustic alkalinity has averaged 1.5 parts per million.

SODA TREATMENT.

It is the practice at the Columbus plant to leave between 25 and 40 parts per million incrustant hardness in the water.

The difference between the incrustant hardness present in the raw water and the incrustant hardness present in the softened water of course represents the quantity incrustant hardness removed.

Water which is overtreated with soda ash will contain what is usually called negative incrustant hardness, and the water which has been over-treated with soda-ash will require a larger quantity of acid to neutralize the sample, in making the incrustant determination than is required to neutralize the volume of the soda reagent originally added.

ALUM TREATMENT.

When sulphate of alumina is added to an alkaline water, part of the alkalinity hardness is converted into incrustant hardness. One (1) grain of alum will reduce the alkalinity hardness of water approximately 8 parts per million. In coagulating water with alum, it is essential that the water contain at least 8 parts per million of alkalinity hardness for each grain of alum added. If the water, to be treated with alum, is deficient in alkalinity hardness then it is customary to add lime or soda ash in quantities sufficient to precipitate the alum, for if the alum is added to water deficient in alkaline salts it will dissolve in the water and remain in solution and be ineffective as a coagulant and may produce injurious results to the water consumer.

When sulphate of alumina is added to an alkaline water the aluminum combines with the alkalinity of the water and a gummy gelatinous precipitate of aluminum hydroxide is formed. This precipitate entrains the suspended matter present in the water, and being heavy, soon settles.

The quantity of sulphate of aluminum required to properly coagulate a water depends upon the amount and character of the turbidity.

During the year 1913, the turbidity of the Scioto river water at Columbus varied from 2,000 parts per million to 7 parts per million, with an average of 69 parts per million, and the quantity of sulphate of alumina varied from 7.7 grains per gallon to 0. 4 grains per gallon, with an average of 1.5 grains per gallon.

At the Columbus Water Softening and Purification Works alum is not only used as a coagulant to entrain the suspended particles and mud, but is also used to reduce the alkalinity hardness of the water.

The magnesium present in the water seems to combine with the lime and soda-ash to form a colloidal precipitate of basic carbonate of magnesium, and the flocculent precipitate formed by the addition of alum drags down this colloidal precipitate, thus reducing the temporary hardness.

Reactions that take place when sulphate of alumina is added to the water:

$Al_2 (SO_4)_3 + 3Ca\ CO_3 + 3H_2O = 2Al\ (OH)_3 + 3Ca\ SO_4 + 3CO_2$.

When lime is used the reaction is as follows:

$Al(SO_4)_3 + 3Ca\ (OH)_2 = 2Al\ (OH)_3 + 3Ca\ SO_4$.

SPECIFICATIONS FOR CHEMICALS USED AT THE COLUMBUS PLANT.

Lime.

For any carload of lime containing 88% of water-soluble calcium oxide, the City will pay to the contractor the price per ton stated in the proposal. It is hereby agreed that the City shall pay a bonus of 1½% of the contract price per ton for each 1%, by which the water-soluble calcium oxide in any carload lot delivered shall exceed 88%, and shall exact a penalty of 1½%, of the contract price per ton for each 1%, by which the water-soluble calcium oxide in any carload lot delivered shall be less than 88%.

Soda-Ash.

The soda ash shall be known as 58% light soda-ash, and shall contain not less than 98% of pure sodium carbonate. The material shall be in dry, powdered form, shall contain no large lumps or large crystals, shall be free from chips and other foreign matter, and not more than 0.5 per cent, shall be insoluble in cold water.

Sulphate of Alumina.

Basic sulphate of alumina, containing no free acid, and crushed into small lumps ranging in size from ½ to 2½ inches, is specified to contain not less than 17% of available water soluble alumina, $Al_2 O_3$. Of this alumina content there shall be at least three per cent of its weight in excess of the amount theoretically required to combine with the sulphuric acid present. The material shall contain not more than 0.5% of matter insoluble in cold distilled water. Sulphate of alumina is shipped unsacked in tight box cars.

ANALYSIS OF LIME.

Determination of Ca O Sugar Test.

Dissolve 1.0 gram of finely pulverized lime in 100 c. c. of a 10% sugar solution.

Shake one hour on shaking machine.

Filter through dry filter.

Titrate 25 c. c. with N/10 $H_2 SO_4$, using phenolphthalein as indicator, the burette reading multiplied by 1.122 = % Ca O.

(The 10% sugar solution should be made with cool, freshly boiled distilled water.)

ANALYSIS OF SODA-ASH.

1. Dissolve 2 grams of sample in 200 c. c. cold, recently boiled distilled water.
2. Titrate 50 c. c. with N/2 $H_2 SO_4$, using methyl orange as indicator.

Burette reading multiplied by 5.3 = % $Na_2 CO_3$.

METHOD OF ANALYSIS FOR SULPHATE OF ALUMINA.

Insoluble Matter.

Dissolve 10 grams and digest for one hour with 100 c. c. of water.

Filter through a Gooch Crucible. Dry and weigh.

Total $Al_2 O_3$.

0.5 gram sample dissolved in 300 c. c. distilled water.

Add 2 c. c. H Cl and heat to boiling.

Make slightly alkaline with $N H_4 OH$ and boil five minutes.

Filter, wash four times, ignite and weigh as R_2O_3.
$Al_2 O_3 = R_2 O_3$ minus total Fe as $Fe_2 O_3$.

Total Iron.

10 gram sample.
Dissolve in 100 c. c. distilled water.
Reduce with H by means of Zn and $H_2 SO_4$.
Titrate with a dilute standard solution of $K Mn O_4$.

Ferrous Iron.

10 gram sample.
Dissolve in 100 c. c. distilled water.
Titrate with a standard solution of $K_2 Cr_2 O_7$.

Ferric Iron.

Total Iron as Fe minus "ous" as Fe = "ic" iron as Fe.
(Note: Blanks should be run on all iron determinations.)

Total SO_3.

0.5 gram sample.
Dissolve in 300 c. c. distilled water.

Add 1 c. c. of H Cl, bring to boil and add drop by drop with constant stirring 15 c. c. of a 10% solution of Ba Cl_2. Boil 30 minutes.

Let stand until precipitate has settled, filter, ignite and weigh.

Free $Al_2 O_3$ or Free $H_2 SO_4$.

(Method obtained from the Laurel Hill Laboratory.)

2 gram sample.
Dissolve in 200 c. c. of boiling distilled water.

Add 1 c. c. phenolphthalein and titrate with a normal solution of Na OH to a faint pink color.

Again boil and titrate, and continue until the pink color remains upon boiling.

Calculate the soda used to $H_2 SO_4$.
$H_2 SO_4$ equivalent to $Al_2 O_3$ found $= Al_2 O_3 \times 2.8792$.
$H_2 SO_4$ equivalent to $Fe_2 O_3$ found $= Fe_2 O_3 \times 1.830$.
$H_2 SO_4$ equivalent to Fe O found = Fe O x 1.361.

If the $H_2 SO_4$ found by titration is greater than found equivalent to the bases, the excess is due to free $H_2 SO_4$. If the $H_2 SO_4$ by titration is less than the equivalent, the difference divided by 2.8792 = Free or Basic $Al_2 O_3$.

Free H_2SO_4. (Beilstein & Crosset.)

2 gram sample.

Dissolve in 5 c. c. cold water, then add 5 c. c. of a saturated solution of $(NH_4)_2SO_4$.

Stir for 15 minutes, add 50 c. c. of 95% alcohol and continue stirring till the precipitate becomes granular.

Filter and wash with 50 c. c. of 95% alcohol.

Evaporate the filtrate to dryness on the water bath. Take up with hot water and titrate with N/10 Na OH, using phenolphthalein as indicated.

Note: It is imperative to run a blank with this determination.

BACTERIAL ANALYSIS.

Total numbers of bacteria are determined by incubating the cultures 24 hours at 37° C. and also after 48 hours at 20° C. Standard Methods of Water Analysis recommends the cultures be incubated 24 hours at 37° C.

Isolation of B Coli Communis.

In the daily routine analysis of the filtered water for the presence of B. Coli Communis, it is our practice to proceed with the following method:

1. Pour Azolitmin lactose Pariete agar plates using 1 c. c. of sample.
2. Inoculate 1 c. c. portion of sample into dextrose broth.
3. Inoculate 1 c. c. portion of sample into lactose bile.
4. Inoculate 50 c. c. portion of sample into 10 c. c. of 10 times normal strength of broth.
5. Incubate at 37 to 40° C.
6. At the end of 24 hours transplant 1 c. c. from 50 c. c. enriched sample into lactose bile.
7. Pour plates from all fermentation tubes that show gas.
8. Fish three characteristic colonies (if present).
9. Transplant from agar slope in lactose bile.
10. If no gas develops make a negative report.
11. If gas develops, then transplant from agar slope into saccharose broth and if gas develops, classify as belonging to B. Coli group or lactose bile fermenting organisms not B. Coli Communis.
12. If no gas develops, continue the subculture into nitrate and indol broths; if these are both positive, we regard the bacterium as either B. Coli Communis or B. Acidi Lactici.

13. Subculture into dulcite, if positive gas production, record as B. Coli Communis.

Intestinal organisms are classified as follows:

Gas in Lactose Bile	Gas in Saccharose	Production of Indol	Production of Nitrate	Gas in Dulcite.
+	0	+	+	+ B. Coli Communis
+	0	+	+	0 B. Acidi Lactici
+	+	No further	tests made	B. Coli Group

Lactose Bile fermenting organisms not B Coli Communis.

1.	B	Lactis Aerogenes.
2.	B	Lactis Aerogenes Capsalatus.
3.	B	Acidi Lactici.
4.	B	Coli Communior.
5.	B	Cloacae.
6.	I	Brown colored organism not identified.
7.	I	Yellow colored organism not identified.
8.	5	White colored organisms not identified.

STATISTICS OF ANALYSIS.

On October 8th, 1913, a committee was appointed by members of the New England Water Works Association to consider and recommend standard forms for reporting statistics of operation.

The report of this committee may be found in the Journal of the New England Water Works Association, Vol. 28, No. 3, September, 1914.

Among their recommendations made is the recommendation that median results be reported rather than average results.

By "median" is meant the magnitude of the item that stands midway in the list of all the items of the group considered when these items are arranged in order of magnitude. For example, the median turbidity for the month is found by arranging the results for 31 days in order of magnitude. The result on the 16th day will be the median. The median turbidity for the entire year is found by arranging the turbidity results on 365 days in order of magnitude, and taking the middle one. In case there is an even number of days in the list, the average of the two days coming in the middle is taken.

The following table showing the turbidity and color of the Scioto river water during the year 1914 is reported in accordance with the standard form recommended by the New England Water Works Association.

ED AT COLUMBUS PLANT

Analytical Results in Parts Per Mil									Tests.		Hypochlorite of Lime P. P. M. Av. Chlorine.	City of Columbus, Ohio. Water Purification Works. Summary of Daily Records for February 1913. Remarks.
tal Hardness.			Total Alkalinity.				Phenol.		Coli Tests.			
Inlet to Settl. Basin.	Settled Water.	Filtered Water.	River.	Inlet to Settl. Basin.	Settled Water.	Filtered Water.	Inlet to Settl. Basin.	Settled Water.	Filt. Water 1 cc.	Filt. Water 50 cc.		

TURBIDITY AND COLOR OF SCIOTO RIVER WATER.

For Year 1914 (Parts per 1,000,000).

Month.	Turbidity									Color.						
	No. of Test Days.	Median Turbidity	Variations; No. of Test Days.							No. of Test Days.	Median Color	Variations; No. of Test Days.				
			0-10	11-25	26-50	51-100	101-250	250-500	Above 500			0-10	11-25	26-50	51-100	Above 100
January	31	10	21	3	3	4	0	0	0	31	15	6	25	0	0	0
February	28	91	0	11	1	3	7	3	3	28	26	0	15	13	0	0
March	31	45	0	7	11	4	3	4	2	31	22	0	23	8	0	0
April	30	73	0	5	7	6	6	5	1	30	25	0	18	12	0	0
May	31	35	0	14	3	3	9	2	0	31	35	0	7	24	0	0
June	30	20	0	30	0	0	0	0	0	30	20	0	29	1	0	0
July	31	1	26	5	0	0	0	0	0	30	15	0	30	0	0	0
August	31	20	0	31	0	0	0	0	0	31	15	0	31	0	0	0
September	30	20	0	29	1	0	0	0	0	30	12	11	19	0	0	0
October	31	15	0	31	0	0	0	0	0	31	8	31	0	0	0	0
November	30	5	29	1	0	0	0	0	0	30	7	30	0	0	0	0
December	31	20	8	18	3	1	1	0	0	31	20	1	29	1	0	0
Total	365	......	84	185	29	21	26	14	6	364	......	79	226	59	0	0
% Time	......	......	22	51	8	6	7	4	2	......	......	21	63	16	0	0

Yearly Median Turbidity*	= 20	Yearly Median Color	= 15
Yearly Average Turbidity	= 54	Yearly Average Color	= 18
Yearly Maximum Turbidity	= 850	Yearly Maximum Color	= 40
Yearly Minimum Turbidity	= 5	Yearly Minimum Color	= 3

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* This is not the average of the monthly median results.

Date.	Gallons of Water Treated.	Percentage Wash Water.	Rate of Filtration in Million Gals. Per A. Per Day.	Chemicals Used.				Chemical	
				Grs. per Gal.			p.p.m.	Total Alkalinity.	
				Alum.	Lime.	Soda.	Hypo.	Raw.	Filtered.
1908.									
October	452,600,000	......	95,000,000	0.8	10.8	4.6	......	185	54
November	467,500,000	4.1	79,000,000	0.6	12.7	5.9	......	208	47
December	460,100,000	2.8	76,000,000	0.2	13.7	7.3	......	223	46
Total	1,380,200,000	6.9	250,000,000	1.6	37.2	17.8	......	611	147
Average	460,066,000	2.3	83,333	0.5	12.4	5.9	......	204	49
1909.									
January	465,100,000	2.4	76,000,000	0.5	14.6	7.8	......	233	43
February	414,800,000	5.4	76,000,000	3.4	9.1	6.6	......	149	51
March	434,700,000	5.2	72,000,000	2.0	6.4	6.1	......	119	47
April	382,600,000	8.7	66,000,000	2.4	6.5	5.7	......	131	46
May	408,800,000	5.5	62,000,000	3.9	7.0	3.4	......	117	40
June	413,700,000	2.5	66,000,000	1.9	6.7	1.7	......	139	37
July	437,800,000	3.2	76,000,000	1.8	6.8	0.4	......	139	32
August	473,400,000	3.3	79,000,000	0.8	6.8	0.5	......	156	35
September	449,200,000	3.1	81,000,000	0.75	6.8	1.7	......	150	38
October	433,400,000	3.2	74,000,000	1.3	8.0	2.9	......	167	36
November	400,800,000	4.1	68,000,000	1.6	9.3	4.9	......	185	43
December	500,300,000	5.3	73,300,000	2.2	6.9	3.7	......	126	38
Total	5,214,600,000	46.9	869,300,000	22.55	94.9	45.4	......	1,807	486
Average	434,550,000	3.9	72,442,000	1.9	7.9	3.8	......	151	40
1910.									
January	507,500,000	4.6	81,000,000	2.6	5.3	2.1	......	94	40
February	442,000,000	2.8	80,000,000	1.6	6.4	2.4	......	106	38
March	446,400,000	2.4	79,000,000	0.9	6.5	3.6	......	136	50
April	414,000,000	2.1	68,000,000	0.4	7.9	5.9	.22	175	55
May	443,300,000	3.6	67,000,000	0.9	7.1	3.1	.32	155	42
June	444,000,000	2.8	77,500,000	2.4	7.9	3.7	.30	177	47
July	477,400,000	2.3	83,000,000	0.36	8.2	3.6	.29	179	44
August	527,000,000	2.2	87,500,000	0.27	8.1	4.5	.25	177	54
September	489,000,000	1.8	94,500,000	0.43	8.4	4.6	.31	177	52
October	489,800,000	1.7	80,000,000	1.30	7.0	7.6	.34	142	53

Results in p. p. m.						Bacterial Results.								
Turbidity.						Raw Water.		Primary Sedimentation.		Secondary Sedimentation.		Clear Well.		
Raw Water.			Filtered Water.			One c. c.		One c. c.		One c. c.		One c. c.		Ten c. c.
Ave.	Max.	Min.	Ave.	Max.	Min.	Count.	Coli.	Count.	Coli.	Count.	Coli.	Count.	Coli.	Coli.
18	25	12	......	......	......	370	......	......	....	479	....	264	......	....
16	22	10	......	......	......	599	+2 —5	......	....	141	....	108	+0 —7	....
10.6	25	4	......	......	......	263	+23 —8	......	....	84	....	60	+1 —30	....
44.6	72	26	......	......	......	1,232	+25 —13	......	....	704	....	432	+1 —37	....
14.9	24	9	......	......	......	411	+8 —4	......	....	235	....	144	+.33 —12	....
7	18	4	......	......	......	435	+3 —28	......	....	12	....	4	+0 —31	+0 —31
256	1,311	12	......	......	......	32,825	+16 —12	......	....	2,146	....	82	+0 —28	+5 —22
109	479	25	17	30	0	18,228	+19 —12	......	....	828	....	81	+1 —30	+6 —25
102	487	29	21	72	10	8,500	+17 —13	......	....	8,662	....	264	+1 —29	+3 —27
196	1,081	36	28	104	10	16,309	+28 —3	......	....	3,523	....	718	+1 —30	+3 —28
92	283	22	14	25	5	3,952	+28 —2	......	....	180	....	121	+0 —30	+2 —28
86	314	20	9.6	20	5	4,009	+29 —2	......	....	42	....	13	+0 —31	+0 —7
24	47	20	4	10	1	1,888	+23 —5	......	....	88	....	29	+0 —30	+0 —31
20	22	18	3	......	0	1,171	+18 —12	......	....	65	....	23	+1 —29	+6 —24
13	19	8	2	.5	1	707	+15 —16	......	....	100	....	23	+0 —31	+1 —30
17	94	7	1.4	5	0	1,300	+10 —20	......	....	60	....	75	+0 —30	+0 —30
107	372	21	0	0	0	21,500	+17 —14	......	....	65	....	11	+2 —29	+12 —19
1,029	4,527	222	100	271	37	110,824	+223 —139	......	....	15,766	....	1,444	+6. —357	+38 —302
85	377	19	8.3	21	3	9,235	+19 —12	......	....	1,314	....	120	+.5 —30	+3 —25
94	323	22	21	200	5	52,000	+26 —2	......	....	1,600	....	65	+0 —31	+11 —20
77	352	20	12	40	5	15,500	+15 —18	......	....	190	....	13	+1 —27	+5 —23
66	377	9	12	30	5	20,000	+9 —22	......	....	190	....	110	+0 —31	+2 —29
22	112	5	4	14	1	2,600	+12 —18	......	....	28	....	32	+0 —30	+4 —26
41	143	8	8	17	2	3,300	+17 —14	......	....	24	....	8	+0 —31	+6 —25
15	26	10	3	8	0	1,100	+11 —19	......	....	12	....	14	+0 —30	+5 —25
24	112	11	4	8	1	1,900	+15 —16	......	....	7	....	2	+0 —31	+2 —29
19	26	13	4	7	2	550	+16 —15	......	....	4	....	1	+1 —30	+2 —29
16	20	18	1.3	4	0.5	700	+10 —20	......	....	2	....	2	+0 —30	+2 —28
44	223	9	3.6	18	0.5	2,200	+18 —13	......	....	42	....	33	+0 —31	+5 —26
							+0						+0	+0

Date.	Gallons of Water Treated.	Percentage Wash Water.	Rate of Filtration in Million Gals. Per A. Per Day.	Chemicals Used.				Chemical	
				Grs. per Gal.			p.p.m.	Total Alkalinity.	
				Alum.	Lime.	Soda.	Hypo.	Raw.	Filtered.
November	453,000,000	0.8	65,000,000	1.5	9.0	11.9	.33	189	58
December	523,900,000	0.6	72,000,000	1.7	9.4	10.9	.31	190	64
Total	5,657,800,000	27.7	934,500,000	14.43	91.2	63.9	2.67	1,897	597
Average	471,450,000	2.3	77,875,000	1.2	7.6	5.3	.29	158	49
1911.									
January	502,200,000	1.7	70,700,000	2.49	6.3	3.6	0.49	110	39
February	425,600,000	1.0	65,000,000	1.12	6.0	3.1	0.47	122	41
March	437,100,000	0.3	60,000,000	0.94	7.7	4.4	0.47	165	45
April	414,000,000	0.8	64,000,000	2.26	7.1	3.5	0.80	138	35
May	496,000,000	1.8	72,000,000	1.72	7.7	4.8	0.52	156	43
June	498,000,000	1.08	72,500,000	1.27	9.8	5.8	0.20	181	48
July	508,400,000	1.2	71,600,000	1.43	9.2	6.1	0.25	173	51
August	527,000,000	1.5	85,000,000	1.22	8.3	5.4	0.40	166	53
September	486,000,000	1.3	71,000,000	1.34	7.7	3.9	0.35	148	44
October	480,500,000	1.5	68,000,000	1.42	6.9	2.5	0.32	141	41
November	465,000,000	1.6	68,900,000	1.86	7.6	4.1	0.35	158	51
December	468,000,000	1.3	65,400,000	1.77	6.8	4.2	0.34	143	49
Total	5,707,800,000	15.08	834,100,000	18.84	90.5	51.4	4.96	1,801	540
Average	475,650,000	1.26	69,508,300	1.57	7.5	4.3	0.41	150	45
1912.									
January	607,600,000	1.2	86,000,000	2.1	7.7	4.0	0.28	144	43
February	617,700,000	1.3	100,500,000	2.6	5.1	0.8	0.34	84	41
March	561,100,000	3.0	98,000,000	3.9	3.4	2.1	0.36	72	50
April	483,000,000	2.1	89,000,000	2.4	6.9	3.4	0.34	136	39
May	489,800,000	1.8	85,100,000	1.3	7.1	2.8	0.32	155	44
June	501,000,000	1.7	69,400,000	1.7	6.7	1.7	0.31	133	38
July	530,000,000	1.7	78,400,000	1.3	7.7	2.7	0.28	155	39
August	515,000,000	1.6	74,200,000	1.1	7.2	2.2	0.28	149	41
September	522,000,000	1.2	81,000,000	1.2	8.3	3.2	0.31	166	44
October	523,900,000	1.4	74,100,000	1.8	8.1	4.2	0.29	163	48
November	492,000,000	2.2	72,000,000	1.7	8.6	6.5	0.25	181	59

Results in p. p. m.						Bacterial Results.								
Turbidity.						Raw Water.		Primary Sedimentation.		Secondary Sedimentation.		Clear Well.		
Raw Water.			Filtered Water.			One c. c.		One c. c.		One c. c.		One c. c.		Ten c. c.
Ave.	Max.	Min.	Ave.	Max.	Min.	Count.	Coli.	Count.	Coli.	Count.	Coli.	Count.	Coli.	Coli.
6	10	4	1.6	17	0.5	300	—30	......	....	10	....	2	—30	—30
20	229	3	1	21	0	12,000	+5 —26	......	....	14	....	2	+0 —31	+0 —31
444	1,954	127	75.5	384	22.5	112,150	+154 —208	......	....	2,123	....	284	+2 —368	+44 —321
37	163	11	6.8	32	1.9	9,346	+13 —17	......	....	177	....	24	+.17 —30	+3 —27
137	723	19	7	22	0	36,000	+7 —24	......	....	43	....	6	+1 —30	+2 —29
146	527	26	8	23	2	8,000	+17 —11	......	....	9	....	2	+0 —28	+0 —28
28	52	20	1	3	0.5	1,500	+3 —28	......	....	7	....	5	+0 —31	+3 —28
117	633	22	5.9	15	1	12,400	+12 —16	......	....	27	....	90	+0 —30	+0 —30
61	482	14	3.8	38	0.5	3,500	+15 —16	......	....	375	....	375	+0 —31	+0 —31
19	23	12	1.5	18	0	800	+0 —30	......	....	9	....	6	+0 —30	+0 —30
14	20	8	0	0	0	1,700	+3 —28	......	....	40	....	16	+0 —31	+0 —31
18	25	13	0	0	0	1,800	+0 —31	......	....	190	....	2	+0 —31	+0 —31
39	138	8	0.1	1	0	2,400	+20 —10	......	....	800	....	3	+0 —30	+2 —28
72	258	20	3.4	15	0	6,500	+23 —8	......	....	160	....	140	+0 —30	+1 —30
98	377	20	5	18	0.25	44,000	+26 —4	......	....	275	....	11	+1 —29	+3 —27
64	227	20	2.5	15	0.25	17,000	+24 —7	......	....	120	....	3	+0 —31	+0 —31
813	3,480	202	38.2	163	4.5	135,600	+152 —213	......	....	2,055	....	659	+2 —362	+11 —354
68	290	17	3.2	14	0.37	11,300	+13 —18	......	....	171	....	55	+.17 —30	+1 —30
67	152	19	7	22	1	59,000	+24 —7	......	....	200	....	2	+0 —31	+1 —30
72	877	17	16.5	85	5	115,000	+17 —12	......	....	517	....	10	+1 —28	+0 —29
296	867	23	25	90	4	29,370	+19 —12	......	....	1,615	....	46	+1 —30	+2 —29
154	650	38	3	10	1	10,471	+21 —9	......	....	1,328	....	51	+0 —30	+0 —30
86	423	22	2	10	0	7,177	+28 —3	......	....	631	....	7	+0 —31	+0 —31
360	784	23	5	20	0	3,677	+20 —10	......	....	192	....	6	+0 —30	+3 —27
76	313	20	1	10	0	1,573	+24 —7	......	....	15	....	3	+0 —31	+0 —31
46	127	25	1	3	0	1,876	+12 —19	......	....	23	....	3	+0 —31	+0 —31
21	25	20	0	1	0	665	+13 —17	......	....	62	....	5	+0 —30	+0 —30
27	200	10	0	5	0	678	+1 —14	......	....	31	....	12	+0 —31	+0 —31
21	38	12	3	15	0	655	+11 —10	......	....	159	....	26	+0 —30	+0 —29

Date.	Gallons of Water Treated.	Percentage Wash Water.	Rate of Filtration in Million. Gals. Per A. Per Day.	Chemicals Used.				Chemical	
				Grs. per Gal.			p.p.m.	Total Alkalinity.	
				Alum.	Lime.	Soda.	Hypo.	Raw.	Filtered.
December	548,700,000	5.5	80,800,000	1.8	9.8	7.7	0.21	116	62
Total	6,391,800,000	24.7	988,500,000	22.9	91.6	41.3	3.57	1,654	548
Average	532,650,000	2.1	82,375,000	1.9	7.6	3.4	0.29	138	45
1913.									
January	527,000,000	2.7	78,000,000	2.9	6.3	2.9	0.15	104	89
February	709,600,000	2.1	83,100,000	1.8	10.2	6.0	0.20	181	58
March	505,300,000	2.3	76,100,000	2.4	8.0	2.5	0.11	109	45
April	504,000,000	2.4	78,800,000	2.0	8.8	2.6	0.22	128	46
May	573,000,000	1.7	89,800,000	1.1	11.3	5.2	0.21	197	61
June	588,000,000	1.2	92,000,000	0.9	11.9	5.9	0.20	193	61
July	620,000,000	1.2	93,000,000	0.7	10.9	5.1	0.19	176	56
August	638,600,000	1.5	95,800,000	0.7	9.8	5.7	0.16	156	53
September	600,000,000	1.6	93,000,000	0.8	9.9	7.5	0.20	169	74
October	561,000,000	1.5	84,000,000	1.7	11.1	8.6	0.20	177	69
November	515,500,000	1.1	81,800,000	1.6	10.9	8.8	0.16	167	75
December	520,800,000	2.1	78,000,000	1.7	8.1	11.7	0.18	165	76
Total	6,862,800,000	21.4	1,023,400,000	18.3	117.2	72.5	2.18	1,922	763
Average	571,900,000	1.8	85,283,300	1.5	9.8	6.0	0.18	160	64
1914.									
January	527,000,000	2.0	88,700,000	1.9	9.2	10.5	0.14	173	69
February	512,400,000	1.5	87,600,000	2.4	8.5	6.3	0.21	134	47
March	527,000,000	1.4	81,700,000	2.6	7.6	4.6	0.00	79	63
April	471,000,000	1.9	75,500,000	2.3	7.5	4.8	0.23	128	47
May	567,800,000	2.0	90,200,000	2.2	8.3	5.3	0.32	143	40
June	591,000,000	0.6	107,700,000	1.7	10.4	7.7	0.24	173	43
July	632,400,000	1.3	118,500,000	1.4	10.0	8.0	0.22	185	48
August	620,000,000	1.2	120,000,000	1.45	10.0	7.9	0.21	185	50
September	576,000,000	1.1	103,750,000	1.3	10.2	8.2	0.22	187	60
October	564,000,000	1.3	100,500,000	1.5	11.6	7.5	0.36	186	64
November	525,000,000	1.6	101,800,000	1.6	12.1	8.7	0.17	197	35
December	592,000,000	1.9	110,500,000	1.9	10.1	8.5	0.15	177	51
Total	6,705,100,000	17.8	1,186,450,000	22.3	115.5	88.0	2.47	1,947	620
Average	558,758,000	1.5	98,870,000	1.9	9.6	7.3	0.21	162	52

Results in p. p. m.						Bacterial Results.								
Turbidity.						Raw Water.		Primary Sedimentation.		Secondary Sedimentation.		Clear Well.		
Raw Water.			Filtered Water.			One c. c.		One c. c.		One c. c.		One c. c.		Ten c. c.
Ave.	Max.	Min.	Ave.	Max.	Min.	Count.	Coli.	Count.	Coli.	Count.	Coli.	Count.	Coli.	Coli.
10	12	10	0	0	0	382	+5 —26	......	....	3	....	1	+0 —31	+1 —30
1,236	3,968	239	63	271	11	230,524	+195 —155	......	....	4,776	....	172	+2 —364	+7 —356
108	380	20	5	23	1	19,210	+16 —18	......	....	398	....	14	+.2 —30	+0.6 —30
198	527	10	16	28	0	29,326	+3 —28	......	....	1,256	....	110	+0 —31	+0 —31
32	388	9	3	15	0	4,578	+14 —14	......	....	22	....	4	+0 —28	+2 —26
280	2,000	47	15	25	1	33,859	+0 —3	......	....	49	....	19	+0 —31	+0 —29
178	417	26	12	25	0	4,764	+24 —6	......	....	64	....	18	+0 —30	+1 —29
20	31	14	0	10	0	421	+9 —22	......	....	90	....	15	+0 —31	+3 —28
21	25	15	0	0	0	372	+13 —17	......	....	235	....	6	+0 —30	+1 —29
18	27	12	0	1	0	158	+17 —14	......	....	46	....	4	+2 —29	+11 —20
18	48	15	0	2	0	197	+11 —20	......	....	31	....	6	+0 —31	+2 —29
16	20	15	2	15	0	232	+19 —11	......	....	3	....	2	+0 —30	+0 —30
14	15	10	11	20	1	423	+12 —19	......	....	7	....	0	+0 —31	+3 —28
20	54	10	5	20	0	945	+14 —16	......	....	17	....	1	+0 —30	+1 —29
11	17	7	7	25	1	442	+5 —26	......	....	11	....	1	+0 —31	+1 —30
826	3,569	190	71	186	8	75,717	+141 —196	......	....	1,831	....	186	+2 —363	+25 —338
69	297	16	6	15	0.25	6,309	+12 —16	......	....	153	....	16	+.08 —30	+2 —28
20	81	5	11	15	2	5,803	+14 —17	......	....	56	....	20	+0 —31	+2 +0 —29 —31
243	337	128	95	119	73	13,905	+19 —9	......	....	307	....	81	+1 —27	+0 +12 —28 —16
211	330	108	96	117	72	27,337	+24 —7	......	....	100	....	23	+0 —31	+0 +0 —31 —31
221	310	104	91	106	82	15,722	+21 —9	......	....	58	....	19	+0 —30	+0 +2 —30 —28
86	268	20	11	25	1	4,363	+21 —10	......	....	28	....	9	+0 —31	+3 +3 —28 —28
18	20	15	0	0	0	263	+11 —19	......	....	10	....	2	+0 —30	+0 +0 —30 —30
16	22	15	0	0	0	276	+14 —17	......	....	15	....	3	+0 —31	+0 +0 —31 —31
20	23	20	0	0	0	434	+15 —16	......	....	7	....	2	+0 —31	+0 +0 —31 —31
19	22	15	0	0	0	443	+15 —15	......	....	5	....	2	+0 —30	+0 +0 —30 —30
18	25	15	0	0	0	326	+12 —19	......	....	7	....	2	+0 —31	+0 +0 —31 —31
7	15	5	0	0	0	216	+2 —28	......	....	7	....	0	+0 —30	+0 +0 —30 +30
22	122	5	0	0	0	6,888	+13 —18	......	....	33	....	2	+0 —31	+0 +0 —31 —31
901	1,575	455	304	382	230	75,976	+181 —184	......	....	633	....	165	+1 —364	+5 +17 —360 —348
75	131	38	25	32	20	6,331	+15 —15	......	....	53	....	14	+.08 —30	+0.4 +1.4 —30 —29

SOME FILTRATION PLANT BACTERIOLOGICAL DATA.

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Briefly the Columbus (Ohio) softening and filtration plant† consists of: (1) A storage reservoir on the Scioto River giving a storage period of about 3 months during extreme low water and less than a day during maximum flood stages, for the most concentrated pollution, which enters some 40 miles above the intake. (2) Devices for pumping and measuring the water and for dissolving and applying the chemicals, which are lime, soda, alum and hypochlorite. (3) Mixing or coagulating tanks. (4) Settling basins. (5) Rapid sand filters. (6) Equalizing reservoirs. At present about 19 million gallons are being treated daily.

In September 1912, the routine bacteriological examination of water at this plant was enlarged, at the suggestion of the writer while assistant chemist, to include a more complete series of presumptive B. coli tests. 37° counts were also added to the river and softened (settled) water samples. The following is a summary and discussion of the results noted during 2 years of such examination. The data presented are, when not otherwise designated, for the period November 1st, 1912 to October 31st, 1914 inclusive.

Presumptive Test. — The general methods recommended by the American Public Health Association (1912) have been followed. The minimum amount of gas denoting a positive test was taken as 15 per cent, tubes being examined after 48 hours' incubation. In addition to inoculating lactose bile tubes directly, inoculations are made in dextrose broth fermentation tubes, bottles of enrichment broth and litmus lactose agar plates. Dextrose broth tubes showing turbidity with or without gas formation are transferred to bile. The enrichment broth is twice normal strength. To 25 c. c. are added 50 c. c. of the sample and if turbidity develops on incubation, bile transfers are made. Litmus-lactose-agar plates are poured, adding 1 c. c. of the sample. After 24 hours at 37° C. the plate is examined and 3 characteristic red colonies if present, are transferred to agar slopes and thence to bile tubes. Recently the plates have been incubated for 24 hours more at 20° C., and frequently colonies are found after this period which had not developed during the first. The lower temperature is used to avoid drying out the media and killing the organisms. Both the direct bile tests and these indirect tests are called positive, if 15 per cent or more gas develops. Tubes are inoculated with graded amounts of sample, in order to secure results which are somewhat quantitative. A sufficient number is taken to have at least one tube show no gas. For the 10 c. c. samples large fermentation tubes are used containing about 35 c. c. of the media.

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† A complete description of plant is given in Proceedings of American Society of Civil Engineers, Jan. 1910, by John H. Gregory.

Relative number of direct and indirect presumptive tests.—During the 2 years mentioned tests were obtained from 1 c. c. river water samples on 646 days out of the 730, and in 1,307 instances as follows:

From lactose bile direct—on 489 days.
From dextrose broth transfers—on 588 days.
From litmus-lactose-agar plate transfers—on 230 days.

Positive tests through dextrose broth were noted on 134 days when direct bile tests were negative and litmus-lactose-agar plate tests were positive on 19 days when neither the bile or dextrose broth-bile tests were positive.

That dextrose broth is a more sensitive medium is in line with the usual experience, and indicative of past pollution. The fact that on some occasions tests were obtained through plate cultures only, is merely accidental and not evidence of its being an especially sensitive medium, since the total number of tests obtained from it was less than half that from bile direct. It may be noted here that on 200 days dextrose broth tubes showed initial turbidity but no gas, yet on transfer to bile tubes, the same showed gas on 122 days.

Table No. 1 shows per cent of time presumptive tests were noted in given volumes of samples.

TABLE NO. I

		50cc	10cc	1cc	1-10cc	1-25cc	1-50cc	1-100cc	1-500cc
Both bile direct and transfers	River	....	....	88.5	47.9	13.2	7.6	3.4	0.1
	Softened (Settled)	39.7	29.5	7.5	0.8	0.5	......	....	....
	Filtered	28.4	17.0	2.9	......	......	......	....	....
Bile direct only	River	....	....	60.7	27.9	9.9	5.8	2.3	0
	Softened (Settled)	....	16.0	1.8	0.3	0	......	....	....
	Filtered	....	9.2	1.1	......	......	......	....	....

Proportion of dextrose fermenters which fermented lactose.—Of 530 river water samples which fermented dextrose, 466 or 87.9 per cent developed gas on transfer to lactose bile. Of 150 filtered water samples which were dextrose positive, only 71 or 47.4 per cent fermented lactose on transfer. This is evidence that certain organisms which ferment dextrose but not lactose are more resistant to the softening process than are the lactose fermenting organisms.

In the river water, the number of samples fermenting dextrose but not lactose was about the same during periods of either long or of short storage — 13.5 and 11.7 per cent respectively.

Enumeration of presumptive B. coli. — A rough approximation of the number per c. c. was obtained by taking the reciprocal of each of the dilutions and multiplying it by the number of days it was the smallest volume showing gas. The sum of these products was then divided by 730 (days in 2 years). The values obtained were: River — 11.85 per c. c., Softened (settled) 0.26 per c. c. Filtered — 0.047 per c. c. The average for the softened (settled) water was much increased owing to the fact that during 5 days in January 1913, the application of lime was purposely omitted to note the effect of its absence. During this period presumptive B. coli were found in both 1/10 c. c. and in 1/25 c. c., the only times noted in this volume.* Excluding these 5 days, the average was 0.095 per c. c. The number in the river water is much increased during flood stages. During 9 months of turbid river water the average number per c. c. was 23.87; during the 15 months of clear water, the number was 4.64.

Anomalies in presumptive tests. — Anomalies of gas formation in a given volume but none in a larger volume, were of rather frequent occurrence. In river water samples they were noted on 25 days, in softened water on 89 days, and in filtered water on 40 days. This includes both the direct and the indirect tests. The anomalies in the direct bile test were: in river water samples on 30 days, in softened water samples on 4 days and in filtered water samples on 2 days. The anomalies through dextrose broth transfers cannot be presented, since in many cases transfers were made only when the corresponding direct bile dilution was negative. The most frequent anomaly on the softened and filtered water samples was gas in 10 c. c., but none in the tube inoculated from the 50 c. c. sample in enrichment broth. This is probably due to overgrowth of B. coli by streptococci or other organisms.

Confirmatory tests. — Although the present tendency is to depend entirely on the presumptive test, the writer believes that confirmatory tests, if not too numerous, are of value. The procedure followed here has been to call organisms typical B. coli which are lactose positive, saccharose negative and indol positive. Such organisms are classified by Standard Methods as either B. coli communis or B. acidi lactici, according as they do or do not ferment dulcite. The dulcite test is also regularly made on cultures from the filtered water. Significance of each test: It is generally considered that forms not producing indol are not characteristic of recent pollution. Chemeshaf† found that in long stored water, organisms fermenting lactose and saccharose, but not dulcite were predominant. The Columbus records show that saccharose fermenters are most common during periods of long stored water as will be noted later. Confirmatory tests are made on all 1 c. c. samples of river water, and on the 1, 10 and 50 c. c. samples of filtered water.

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* The bacteriological effect of water softening is discussed in detail in the Engineering Record of September 6th, 1913.

Routine followed in making confirmatory tests.—Cultures which ferment lactose are transferred to saccharose, those which do not ferment saccharose are transferred to broth and tested after 4 days for indol formation. Those which form indol are transferred to dulcite. This procedure saves culture media and time, but does not afford as good comparative results as might be obtained by inoculating the cultures into all of the above media at once. Method of making plate cultures—2 drops of the bile culture are placed in 50 c. c. of sterile water, the bottle well shaken, then 2 drops from this dilution are placed in a second bottle of sterile water, and after shaking, 2 drops are transferred to a sterile petri dish and 7 c. c. of litmus-lactose-agar medium added. This usually gives not over 100 colonies to a plate. It might be noted that if a plate is made directly from a dextrose broth tube it will often contain spreading colonies which contaminate or even prevent the growth of B. coli; but if a transfer is made to a lactose bile tube, then after incubation, a plate be made no spreaders appear, in fact a pure culture of B. coli is often obtained. From the plate 3 characteristic colonies are transferred to agar slopes and thence to the media noted above.

Proportion of presumptive tests confirmed.—River water 1 c. c. samples: Confirmatory tests were obtained on 380 days which was 58.8 per cent of the number of presumptive tests. 51.0 per cent of the direct bile presumptive tests, 44.9 per cent of the presumptive tests through dextrose broth and 47.0 per cent of those through litmus-lactose-agar plates were confirmed. Filtered water: Presumptive tests were noted on 347 occasions (in 1, 10 and 50 c. c.) of which 32.8 per cent were confirmed. Since 58.8 per cent of the river water presumptive tests were confirmed, the softening process would seem to render atypical many of the organisms not killed. Of the 1 c. c. presumptive tests 31.6 per cent were confirmed, of the 10 c. c. tests 27.0 per cent and of the 50 c. c. tests 36.4 per cent were confirmed. On the days when the filtered water gave confirmatory tests, transfers were made to dulcite and found positive 60.5 per cent of the time.

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† The Bacteriology of Surface Waters in the Tropics.

Detailed results of confirmatory tests.—Of 3,586 colonies picked from river water plates (direct and from bile and dextrose broth transfers to bile), 2,717 fermented lactose. Of these 1,045 or 38.5 per cent fermented saccharose. Of the 1,672 remaining 347 or 20.8 per cent did not form indol, leaving 1,325 which were termed typical B. coli. This was 37.0 per cent of the total picked and 48.7 per cent of those which fermented lactose. Of 852 colonies picked from filtered water plates 610 fermented lactose. Of these 280 or 46.0 per cent fermented saccharose. Of the 330 remaining 50 or 15.2 per cent did not form indol, leaving 280 which were termed typical B. coli. This was 32.9 per cent of the total picked and 45.9 per cent of those which fermented lactose. Of these, 148 or 52.9 per cent fermented dulcite.

Storage as affecting proportion of saccharose fermenters.—Of the lactose fermenting colonies from river water during 9 months of turbid water, 27.9 per cent fermented saccharose as compared with 47.0 per cent during the 15 months of clear water (long storage). Of the filtered water colonies during the period of turbid river water 25.7 per cent and during the remaining months 55.9 per cent fermented saccharose. The months of turbid river water were the first 4 of 1913 and the first 5 of 1914. The average turbidity was 139 P. P. M. During the remaining months the average turbidity was 18 P. P. M. The proportion of saccharose fermenters is greatly increased through long storage periods. There is also evidence that saccharose fermenters are more resistant to lime treatment, since their proportion is greater in the treated than in the raw water. In October, 1914 the difference was more pronounced than usual, 50 out of 53 lactose fermenting colonies were saccharose fermenters as compared with 48 out of 109 in the river water.

Storage as affecting proportion of indol-forming organisms.—In river water samples the proportion of organisms forming indol was slightly greater during the months of turbid water than during the months of clear, but in the filtered water, during the same periods, this was reversed. The difference here was only slight, thus the Columbus results do not confirm the usual opinion that B. coli in long stored water tend to lose the power of forming indol.

Storage as affecting the proportion of dulcite fermenters. — A tabulation of the dulcite tests (made only on filtered water cultures) showed no relation between their number and time of storage. In the year ending October 1913, the proportion of this type was greater during the months of longest storage, but in the following year the proportion was reversed. This is contrary to Chemesha's experience (previously cited).

Agar and gelatine counts. — During the year ending December, 1912, there were 174 days on which complete agar and gelatine counts (48 hours at 20 C.) were obtained. Liquefaction of one or more gelatine plates occurred on the remaining days. The average counts were:

	Agar	*Gelatine*
River	4,786	4,331
Softened	170	708
Filtered	8	13

In the river water the agar counts were usually the higher, in the softened and filtered water gelatine counts were generally higher as shown by the following:

	River	*Softened*	*Filtered*
Number of days gelatine count higher	59	108	79
Number of days agar count higher	95	50	49
Number of days both were same	20	16	46
Number of months gelatine count higher	3	11	7

No relation was noted between the river water agar and gelatine counts and the factors storage or temperature. The highest gelatine counts on the softened and on the filtered water occurred during periods of clear (long stored) warm river water. Often during such periods the gelatine counts were enormously higher than the agar; such counts as agar 5, gelatine 5,000 being noted. At such times the river water gelatine count is usually only a few hundred. These higher counts are due to an unidentified species which give very small colonies on gelatine after 48 hours but quite distinct after 72. They may be due either to an increase in number of some species present in the river water or introduced by dust, as the settling basins are uncovered; or they may be present owing to an overturning of the sludge from the bottom of the basins.

Comparison of agar 37° (24 hour) and 20° (48 hour) counts. Duing the 2-year period the average counts were:

	River	*Softened*	*Filtered*
20°	6,162	108	16
37°	433	15	3

The 20° counts averaging much higher and being higher most of the time, as during this period:

	River	*Softened*	*Filtered*
Percent of time 20° count higher....	87.8	76.9	55.0
Percent of time 37° count higher....	10.2	15.7	19.4
Percent of time the same............	2.0	7.4	25.6

The 37° count was higher more often on softened and on filtered water samples than on river samples, indicating that, in general, organisms growing at 37° are more resistant to the softening process. This might appear inconsistent with the fact that B. coli are less resistant; it should be noted, however, that the B. coli group are only a small proportion of all the bacteria which grow at 37°. The relative number of bacteria growing at 37° and 20° is greatly affected by the amount of storage which the river water has had. This is shown in table No. 2, in which the 9 months of turbid water are designated by "A" and the 15 months clear water (long storage) by "B".

TABLE NO. 2.

	Percent 37° Count is of 20°		*Percent of time 37° Count is same as, or higher than 20°*	
	A	B	A	B
River	5.5	43.8	0	18.4
Softened	8.3	14.0	10.7	20.3
Filtered	5.9	20.0	29.7	36.0

It is seen that during periods of long storage the proportion of organisms growing at 37° C. is greatly increased, and at such times their number is frequently as much as, or more than those growing at 20°.

Relation between number of B. coli group and total number of bacteria at 37°.—This ratio was found to be quite irregular, and not dependent upon either storage or temperature. Thus in November, 1913, the number of B. coli (presumptive) in the river water was 2.9 per cent of the total bacteria, as compared with 20.1 per cent in December, 1913. The average temperatures were 47 and 43 F.; the average turbidities 20 and 11 P. P. M. respectively. In May, 1913, the average number of B. coli in the filtered water was 11.2 per cent, and in June 0.1 per cent of the total. Temperature and turbidity of the raw water were practically the same. A consistent ratio could not be expected, since the plate count is much more accurate than the fermentation tube estimation. While it is not believed that this accounts for the wide variation, no further explanation can be offered at present*. Although not of much significance, the following averages were found: In river water B. coli group were 4.15 per cent, in softened water 1.91 per cent and in filtered water 2.44 per cent of the total bacteria at 37°.

Thus the ratio between the number of B. coli and the total number of bacteria is less, as a rule, in the treated than in the raw water.

Conclusions.—(1) The bacteriological character of the Scioto River water during periods of long storage varies from that during flood stages in that: (a) The number of bacteria is much less. (b) The 37° agar count is a much higher proportion of the 20° count. (c) Of the B. coli group, the saccharose fermenting type are the most numerous.

(2) The lime softened water varies bacteriologically from the raw water in that: (a) The number of bacteria is much less. (b) ratio of the number of B. coli to the total number of bacteria is less. (c) The saccharose-fermenting types of B. coli are much more numerous. (d) The proportion of dextrose fermenters which do not ferment lactose is much greater. (e) The ratio of the 37° to the 20° count is greater. (f) The ratio of the gelatine to the agar count is very much higher.

(3) The proportion of organisms not fermenting dulcite is not affected either by storage or by lime-treatment. This is also true of those which do not form indol.

(4) The members of the B. coli group form somewhat less than 4 per cent of the total number of bacteria at 37° C. This ratio is, however, quite irregular.

(5) The proportion of organisms in the river water which ferment dextrose but not lactose is not affected by storage.

PLUMBING AND ITS RELATION TO HEALTH.

Wm. C. Groeniger,

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We live but a few brief years and we cannot afford to suspend for a single instant any of our activities in the campaign for the prevention of needless sickness and deaths. Consequently it would not be desirable to relax our efforts and permit plumbing to be installed in a careless, reckless, haphazard and insanitary manner.

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* This point is discussed at length by Gärtner, (Zeitschrift für Hygiene, Vol. 67, P. 55) who strongly condemns the B. coli test for this reason.

It would appear no difficult matter to prove, were civilization to be turned backward to those times when conditions prevailed which were prolific in filthy diseases and plagues, that plumbing is a considerable quantity. It is better to be clean, healthy and vigorous and remove our sewage througth the agency of the plumbing system, rather than return to the ways of the people who inhabited the city of Rome a few centuries ago when the prevailing custom was to throw liquids and solid wastes from the windows, oft' times to the discomfort and injury of those who happened to be in the street below.

The public press, if it is to maintain its standing with the public, must print facts; preconceived theories must not be expressed without basis and evident prejudice must not be too apparent in their editorials or news columns. It is possible to prejudice the public mind falsely for a little while, but the real facts are bound to eventually come out.

The Journal of the American Medical Association is recognized as a publication of enlightening and instructive character giving reliable information upon matters pertaining to preventive medicine. Very frequently one may find abstracts and editorials printed in the daily press and health bulletins credited to this prominent medical and public health publication, which is naturally looked upon and considered an authority.

In the issue of the "Journal of the American Medical Association" under date of August 29, 1914, page 784, appears an editorial "Plumbing and Health", and the statements are made that:

> "Defective plumbing has about as much relation to public health as any other mechanical defect in house construction."

and furthermore that—

> "A connection between plumbing and health has been shown to exist at just one point.
>
> "Plumbing is of value to public health only so far as it removes from the immediate neighorhood of dwellings and so does away with the dangers of fly-borne typhoid and other infections, which arise from allowing infectious materials to accumulate."

These two statements are incompatible. Plumbing certainly does not bear the same relationship to house construction as the painting, plastering, hardware, brick, lumber, thickness of walls or carrying weight.

It is true that thousands of houses are without plumbing and there are others in which the mistake has been made of moving the privy vault into the house under the guise of sanitary plumbing.

Many of the mechanical and structural defects in plumbing and drainage have both an esthetic and physical effect upon the occupants. Plumbing, heating, ventilating, lighting and vacuum cleaning can be rightfully classed as domestic sanitary engineering. The mechanical or structural defects may have a marked physical effect upon the occupants.

It is admitted and acknowledged that the removal of wastes and perhaps infectious materials through the agency of the plumbing system is of value to public health, and it, of course, must follow that the failure of a system of plumbing to perform this function would be, and is dangerous to public health. The question would then arise, what if any factors could be considered that would prevent a system of plumbing performing the function of removing obnoxious waste material and cause it to be dangerous to public health, and how important and how great is the value that can be placed upon the removal of these materials through the agency of plumbing.

Briefly the chief requirements of a system of plumbing and drainage are—

*1st — An adequate supply of water that will properly flush all of the fixtures at one and the same time.

2nd — A type of fixture of porcelain, porcelain enameled iron, or other non-absorbent material set in the open in well lighted and ventilated rooms, with floors of waterproof, least absorbent indestructible material.

3rd — A system having waste pipes large enough to receive the wastes at the same time, but not too large to prevent a thorough scouring and self cleansing action.

4th — A system of ventilation that will properly ventilate all portions of a drainage system and protect fixture traps from siphonage, back pressure, momentum and capillary attraction.

5th — A system of piping that will not corrode easily nor be affected by sudden changes in temperature with the joints equally as strong as the pipe itself.

6th — A properly graded, perfectly gas- and water-tight system that will discharge by gravity.

7th — A system properly supported over its entire length provided with the proper swing joints to protect it from shrinkages, settlements and temperature changes of the piping without danger to the plumbing fixtures.

8th — A system of installation provided with fittings of easy turns and angles that will not intercept the flow and cause stoppages. Also with clean-outs installed at the proper turns in order that the entire system may be accessible.

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* Cosgrove — Principles and Practice of Plumbing.

It is obvious that when any of the above requirements of the plumbing system are inoperative or defective the function of the plumbing system to remove obnoxious and oftentimes infectious materials from the immediate neighborhood of a building is not carried out, and, therefore, is dangerous to public health.

Plumbing does not always remove waste material from the premises and it is often installed in such a manner that the material is deposited in a bathroom, kitchen, cellar, on the roof or in the yard of buildings where the opportunity of soil pollution, direct and indirect contact is certain. It is obvious that a building in which the cellar bottom has been polluted with sewage through faulty and defective piping is a menace and a detriment to the health of the occupants.

The roller towel and common drinking cup have been condemned as agencies concerned in the transmission of infectious and contagious diseases. The main objection to their use is that one person may infect another by indirect contact. If the common use of the drinking cup and roller towel is dangerous, is it not obvious that the common use of the plumbing fixture, which is a receiver of domestic wastes, human excreta and urine, would, if not made "fool proof", harbor all of the dangers of the roller towel and drinking cup. Direct contact with plumbing fixtures, either by the hand or some portion of the body is almost invariably essential in their use. The danger of contact from the shoes to the hand and to the mouth is neither impossible nor improbable.

The open sewer connection in cellars not only offers a free flow of sewer air into the building, but a natural highway for rats passing from one building to another, and who will deny that this pest is a known disease carrier? He will travel from the sewer to the pantry, walk over food and back to the sewer.

Reckless, incompetent and ignorant plumbers so-called will connect the vent pipe from a sewer system with the surface or local ventilation system.

Owing to the amount of lime and other chemicals in many of our municipal supplies, the cistern is a favorite source of supply for laundry and bathing purposes, and with the advent of the electric and water power pump, it is only necessary to open the faucet to secure all of the soft water desired.

This system is automatic in its action. The pump discharges into a pneumatic tank until a pressure of about 35 pounds is raised, when the current is cut off. After sufficient water has been drawn off to lower the pressure to about 20 pounds the power is again switched on until maximum pressure is restored.

As the motor is small and the pump operates only for short periods the amount of electricity used is small and the cost is comparatively on a par with the use of city water through meter. A water driven motor is also often used in connection with this system.

Nothing on the surface would indicate that this system would have any direct connection or has been known to have been the cause of much sickness and therein lies the fallacy. In thousands of instances overflows from cisterns have been connected directly with the house sewer by trapped and untrapped connections. A permanent water seal in the traps cannot be maintained and water in the cistern is subject to pollution from back flow due to stoppage.

In one particular instance the writer was called to a residence to repair a water motor. The servant explained they were in urgent need of rain water for bathing purposes and commented that the cistern probably needed cleaning as the rain water had a very offensive odor.

Investigation determined the fact that the house sewer had become clogged at a point beyond the branch serving the cistern overflow and all of the household sewage was discharging into the cistern converting it into a tight cesspool, the contents of which were being pumped back into the house to be used over again.

Further investigation revealed that there were two cases of typhoid fever in this house and the system when installed had not been subjected to that "rigid inspection" so often criticised. This is one of similar instances and proves that without regulations and inspection a plumbing system is not "Fool Proof" nor "Disease Proof".

Another criticism that can be reasonably offered is that the municipal supply which is used for drinking, and cooking purposes and for flushing toilets is very often for emergencies by-passed with the rain water system and when the cistern water is polluted, a means of contaminating and polluting the drinking water supply is provided.

Another method by which a water system can be polluted is through the flushometer valve (which is rapidly succeeding the closet tank) being set below the top of the closet bowl, when in the event of stoppage a certain amount of the liquids would be siphoned back through the supply system and pollute the supply.

On some frost-proof closets on the market the same criticism can be offered. The main valve and trap are placed below the frost line, the valve is connected to a seat valve opening in the rear of the hopper. The valve is also connected to the trap which relieves the water in the vertical line when not in use, protecting the flush pipe and tank from frost.

A stoppage in the closet will raise sewage to the height of the bowl and a temporary relax in the city pressure will siphon the contents of the hopper back into the supply system.

It may be said that the danger of the flushometer valve and frost-proof closet polluting a water supply in this manner is remote, but it is always the gun that is not loaded that explodes and kills people.

In discussing a matter of this kind it is not of sufficient importance to consider the mental as well as the physical health and is it not true that the establishment of public comfort stations eliminates the pollution of alleys and streets?

Plumbing is the chief requirement of a public comfort station and it must be given due credit for the elimination of these pest spots where every law of health and decency is being violated daily.

In some of our larger cities alleys were considered and used as "Public Convenience Stations" and to give a semblance of decency and respectability regulations were posted—

> "Go back twenty feet"

or

> "Commit no nuisance under the penalty of the law."

Are not public comfort stations a matter of public need and decency?

Every intelligent person is supporting and advocating this public necessity and one of the strongest reasons why they should be considered necessities is that every public comfort station and every public drinking fountain is a practical temperance reformer. With but few exceptions the only available comfort stations are closed when the saloon closes.

There is abundant proof of disease being contracted by people through the agency of inadequate, insanitary and defective plumbing and there are so many factors dependent upon the safe and speedy removal of obnoxious and dangerous materials that it is not important to consider the statement that

> "Disease germs are not found in sewer air."

except to say that we would not recommend the continued practice of breathing "sewer air".

"Sewer air" means bad air and bad air means bad health and a man or woman handicapped by bad health cannot make a success in life and no human being would willingly select a sewer as an ideal place to live in, nor will he willingly continue to breath sewer air, sewer gas or sewer vapor.

"Sewer air" is without smell and is only found in well constructed and ventilated sewers and contains double the amount of carbon dioxide that is present in the outside air.

"Sewer gas" is the result of stagnation, deposit and putrefaction of sewage and is found in poorly constructed and poorly ventilated sewer systems.

Analysis of the gases present in sewers shows the following to be the most prominent:

> Carbonic acid, nitrogen, carbureted hydrogen, sulphureted hydrogen, carbon disulphide, moisture and compounds of ammonia allied with methylamine and ethylamine.

One of the most important factors which is entitled to worthy consideration from a theoretical as well as a practical viewpoint and one that is generally overlooked is the fact that sewer and drainage pipes in houses and streets are oft' times filled with sewer vapor and not sewer air. It is a common sight, especially true in protracted weather to see vapor flowing from sewer manholes in our city streets. To the increased use of hot water in our residences, apartment houses, hotels, office buildings, mercantile establishments and factories, the illegal connection of blow-offs from steam boilers to the drainage system without cooling devices, and the lack of proper sewer ventilation, can be credited the principal causes of this condition.

What is vapor? "A heated fluid, a moist floating substance, in the gaseous or aëriform state, the condition of which is ordinarily that of a liquid or solid." The term vapor is sometimes used in a more extended sense as identical with gas, and the difference between the two is not so much one of kind as of degree. The atmosphere contains more or less vapor or water, a portion of which, on the reduction of temperature, becomes condensed into liquid water in the form of rain or dew. If the above is true, would it not be reasonable to believe that sewer vapor is sewage in a gaseous or aëriform state? We know that sewage is composed of domestic and industrial wastes, human excreta and urine, the latter two being the greatest hazards to man. Would it not necessarily follow that vapor arising from sewage containing obnoxious material would likewise contain particles of this material?

Each succeeding day adds to our knowledge that fresh air is one of the most important essentials to man's welfare, but from the article above referred to it would appear that the Journal of the American Medical Association would have traps and sewer ventilation omitted, which would permit a free flow of sewer air, sewer gas or sewer vapor into houses.

A great many people still cling to the "moth eaten" notion that plumbing codes are created for the sole benefit of plumbers and that the public is made their legalized prey and this idea is kept in the limelight by real estate speculators, specialty and material manufacturers whose only interest is mercenary.

The administration of the state plumbing code has demonstrated the opposite, especially in our rural communities where prior to its inception the public were at the mercy of the irresponsible, reckless plumber.

The farmer and those living in our smaller cities and villages are entitled and should receive the same amount of protection from the mechanical, structural and physical defects that are sure to predominate in the absence of governmental regulations as are their city brothers.

No humanitarian, social, moral, financial or sanitary argument can be adduced against the enactment of and the standardization of plumbing codes by state and nation, which will mean simplicity, economy and efficiency.

This will not only eliminate commercially interested individuals and corporations but any other organization whose interests arise from a purely selfish motive.

A plumbing system in a great measure must be installed in a natural manner, in accord with the laws of nature and whenever or wherever these principles are violated humanity pays the price in proportion to the disregard of sanitary conditions.

LIMITATIONS OF PREVENTION OF COMMUNICABLE DISEASES.

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A short review of the measures and means at our disposal for the prevention of communicable diseases with a discussion of their real value, their reliability at some times and inefficiency at others ought to be in a meeting like ours a proper and useful employment of our time.

It is true that our present knowledge, or rather lack of knowledge of disease-producing germs concerning their biological characteristics and their life circles, especially their abode during the intervals of human invasion and the way in which they gain access to a new host, does not always allow of a definite verdict, and this is so much more true as the causes of some of the most important diseases as smallpox, scarlet fever, etc., have not even been isolated. But since 1882, the year of birth of modern sanitation, for in this year the germ-theory under Dr. Koch's guidance gained its final victory, an enormous amount of positive facts has been brought to light, and just at present by the use of the monkey as an experimental animal, our knowledge is rapidly advancing into heretofore dark regions, so that in many instances we can form a fairly good judgment as to our powers and limitations in the prevention of diseases. Our armamentorium is not very small. We have notification, isolation, disinfection, immunization against certain diseases, destruction of germ-carriers as mosquitoes, flies, rats, public and private cleanliness, and last but not least, instruction of the public.

NOTIFICATION.

Notification of communicable diseases to the Board of Health is the electric button that sets the whole machinery to work. We cannot hope to hear of every communicable disease. Setting aside the few cases where a physician purposely and criminally keeps from us the important knowledge to save a favorite family from restriction of liberty and the trouble that goes along with it, there are among even the most dreaded diseases, cases which cause such light symptoms that they cannot be recognized. I have seen cases of smallpox without eruption. The diagnosis was possible for I had in the family well pronounced cases. Then a new member came down with head-ache, back-ache and high fever. The symptoms lasted for three days, then the patient became suddenly well without developing a pimple. Scarlet fever is frequently so light that no physician is called. The same thing is true in infantile paralysis. The child is somewhat fretful for a day or two, then recovers without developing any paralysis. Add to it diphtheria. The lighter cases can only be diagnosed by the laboratory. Then there are the venereal diseases. No other disease causes so much conjugal unhappiness, suffering of women and blindness of children as gonorrhoea. No other disease contributes more to the mental and physical degeneration of the human race than syphilis. But just as long as we hold the sins and secrets of the individual more sacred and inviolable than the health and welfare of the community, the venereal diseases will not be reported and will thrive under the mantle of darkness.

ISOLATION.

Isolation is among the most ancient and still one of the best methods to check the spread of communicable diseases. The most effective way to isolate patients is to gather them into hospitals. Isolation in a private family is rarely complete and a disease frequently spreads among the inmates of a quarantined house. Even if we have a house guarded day and night, breaks may occur. Then we have, at least in the summer time, to screen all the windows against germ-carriers. In 1902 I noticed that smallpox spread from the hospital in the direction of the prevailing winds. I thought that the flies which were extremely numerous that year, carried the disease. I had all the windows screened and the spread ceased. Other diseases may be carried by flies. That yellow fever patients have to be screened in against the stegomya fasciata and malarial patients against the anapheles mosquito needs only to be mentioned. Where patients cannot be placed in a hospital, complete isolation is difficult to maintain. But there are cases where it is not practicable. Influenza spreads with such frightful rapidity that it soon becomes impossible to isolate all cases. Measles, in spite of the Koplik symptom, is practically never announced to the Board of Health, until the rash appears, and when we placard the house, the damage is done, for the communicability of the disease is greatest during the catarrhal stage and disappears forty-eight hours after the eruption shows up. This is the cause why we cannot halt an epidemic of measles. That other diseases as smallpox, scarlet fever, whooping cough, etc., are frequently announced to us in an advanced stage is well known. But I intend to speak only of instances where we are powerless and such an instance is the diphtheria bacillus carrier. The experiment of Baltimore in the spring of the year 1911 showed that 3.55% of the whole population had the Klebs-Loeffler bacillus in mouth, nose or throat. With a population of 650,000 people that would give us in Cleveland over 23,000 diphtheria germ-carriers. During an epidemic in one of the largest cities of Germany, it was found that 9.4% of the whole population carried the diphtheria germ. This would give us for Cleveland 63,100 carriers. Could we isolate such a number of people even if we knew of them? The problem is beyond us. It is only lucky for us that according to Schick's reaction, the majority of people are at least temporarily immune, against diphtheria. The Swedish Royal Commission that investigated several epidemics of infantile paralysis showed through experiments on monkeys that there are a great many more germ-carriers than cases of the disease. The same is true of cerebro-spinal meningitis and pneumonia. Future investigations are likely to add scarlet fever and whooping cough to this class of diseases.

Further isolation of all patients afflicted with tuberculosis is not possible, simply on account of their great number, and with the isolation of syphilitics, we have only made a weak beginning.

DISINFECTION.

The followers of the decomposition theory fumigated. They subdued one smell by another and that is all they obtained. We now have a set purpose. We want to kill the germs that cause disease, and we disinfect. There are people now, learned physicians and well known sanatarians who say that disinfection is no better than fumigation. This assertion is not justified, although I grant that most disinfection that is done after a disease is over and just before the quarantine is lifted, does not accomplish its aim. But the disinfection which is done during the disease, kills uncountable billions of disease-producing germs which formerly were not killed. The best disinfectant is heat. The destruction of tubercular sputum by fire, the boiling of all typhoidal stools, the boiling of all bed-clothing, body linen, forks, knives, spoons, cups, plates and drinking glasses of all patients suffering with communicable diseases of a dangerous character or even their immersion for several hours in a strong antiseptic solution are now indispensable measures, not only in hospital practice, but also in the home treatment, and these measures can be made thoroughly efficient and reliable. All the antiseptic and aseptic measures of modern surgery are based on disinfection. Maternity hospitals which were formerly regular pest-houses, are at present kept at the high state of salubrity only by constant measures of disinfection. Disinfection in a broad sense is simply the killing of disease-producing germs during the time they are out-side of the human system, regardless of the means and methods employed. It saves thousand upon thousands of lives and is indispensable to modern sanitation. But we can kill germs only when they are outside of the human system and all our disinfection is worthless against germ-carriers, be these germs in mouth, nose and throat or in the intestinal tract. Disinfection after typhoid fever has been advocated. Except the boiling of the bed-clothing and body linen, as already mentioned and a bichloride bath of the patient, I believe it would be useless. Disinfection after measles is no longer practiced. I also consider it useless after diphtheria. After infantile paralysis we can destroy the germs that are around the objects near the patients and on the floor and dust of the sick-room, but we cannot destroy the germs that remain in mouth, nose and throat. In fact disinfection can only destroy germs which are outside the human system.

IMMUNIZATION.

The classical disease against which we can immunize humanity is smallpox. Vaccination is smallpox that has been passed through the bovine kind for several generations and is then re-transplanted upon the human race. It is a reliable protection against the dreaded disease, but a great proportion of people will not avail themselves of this protection. We have also a reliable vaccine against typhoid fever, but except for immunization of troops, it has so far not been generally used. The Pasteur treatment forestalls an attack of rabies; tetanus can be warded off when the virus is used before any symptoms appear, and we can immunize against diphtheria. These are the diseases which are at present to some extent controlled by immunization.

DISTRUCTION OF GERM-CARRIERS.

That the plasmodium of malaria is carried by the anapheles, and the yellow fever germ by the stegomya fasciata mosquito, is now beyound doubt and much has been done in infected places, to destroy the mosquitoes. The success of the United States Government in the zone of the Panama Canal has been marvelous. A country that has for centuries been uninhabitable for the people of the North was made as healthful as any place of the United States. Also in many other places the warfare against mosquitoes has given excellent results, but we are far yet from the extirpation of all anapheles and stegomya fasciata mosquitoes. With us the house-fly is the great problem. The possibility of its spreading many diseases must be admitted without controversy, but the actual facts are at present known not sufficiently. Many cities now organize fly-campaigns and the results are quite noticeable in two ways. First: The amount of house-flies has diminished. Second: It serves as a great educator of the children and urges cleanliness in every house-hold. It is on the second account that I have always encouraged a campaign against flies. We have usually the most communicable diseases in seasons which are free of flies, so that their importance as transmitters of diseases seems to me exaggerated, at least as far as the North is concerned. Active campaigns against the rat and its fleas are to my knowledge only waged in cities where bubonic plague has made its appearance, as in San Francisco and New Orleans. Russian physicans claim that bed-bugs and body-lice are instrumental in the spread of typhus fever. What other vermin as roaches, fleas of dogs, may accomplish, we do not know. But I do know that with the appropriations we receive and the help at our hand we cannot even begin to extirpate all the insects that carry or may carry disease germs.

CLEANLINESS.

This was the old stand-by and main weapon of the followers of the decomposition theory. As they believed that all pestilential diseases sprang from filth, they naturally preached the most scrupulous and most conscientious private and public cleanliness. Their belief was wrong, but their teaching was all right. In justice to them let us remember that they insisted on sewering, paving and cleaning of all streets; that they perfected our modern plumbing system and insisted upon filtration of polluted drinking water. They filtered the water not to free it from dangerous germs as they did not know anything about them, but to remove all filth from it, and they reached the right result. Filtration of any water used for drinking which is polluted by sewage is today the only means to effectively control typhoid fever and Asiatic cholera, the two water-borne diseases par excellence, as a sufficient dose of chlorine to kill all germs is frequently found objectionable to the palate of the consumer. Then I share the belief of the people who think that all filth ought to be removed from drinking water. The knowledge that sewage is in the water, I do not care how much diluted it is, disgusts any one from drinking it. The filtration of polluted drinking water is, as already said, an effective and most necessary measure of modern sanitation. But here is the rub: it is not under our control. We may clamor for filtration as much as we like, if the men in power choose to disagree with us, they may. So are sewering, paving and cleaning of the streets not under our control, still they are necessary in a large city. Not that the smells arising from dirty streets or back-yard toilets, give rise to pestilential diseases, but it is my firm opinion that they lower the vitality of the people, diminish their reserve force and rob them of their natural immunity against contagious diseases. I know I am treading here on theoretical ground, but it cannot be denied that bad smells cause the closing of the windows and the exclusion of fresh air. Then some of the rising gases are doubtlessly poisonous to the nervous system as long as they cause nausea and head-aches. The experience of all nations for thousands of years testifies to the fact that filth and uncleanliness are invariably followed by diseases in overwhelming number and an unduly large death-rate.

EDUCATION OF THE PUBLIC.

True progress in sanitation is only possible when people are shown the need of it. After they understand the measures which we advocate, and see the benefit which they derive from them, they all become co-workers, and active supporters of the Board of Health. They begin to clamor for an active health department. They demand a vigorous enforcement of all sanitary regulations, announce to us existing nuisances, breaks of quarantine or communicable diseases of which we have no knowledge. But far more important it is that an enlightened public will uphold its Board of Health financially. No large measures of sanitation are possible except where the public understand their purpose and appreciate their value. Therefore the people must be instructed in every phase of modern hygiene and sanitation. I hold that in every instance, they ought to be told the exact truth. They ought to know just where we are standing. This is the reason why I wished to point out to you the diseases against which we are powerless, the conditions which we cannot change and the measures which frequently are ineffective. It will not do for us to try to mystify the people. They ought to know the full truths. It will not do for us to find reasons and excuses, when we fail to check an epidemic. There are instances where it is not in our power to do it, and we ought to say so in full frankness.

Modern sanitation has done a world of good. It has diminished the number of diseases and shortened the death-rate in all parts of the civilized world. It has lengthened life and made it more enjoyable, by decreasing physical suffering and mental grief. We know today what we can do and are positive of our power. Therefore we do not need to be ashamed to confess the spots wherein we are weak.

THE ECONOMIC LOSS TO THE COMMUNITY FROM PREVENTABLE DISEASES.

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Everything in this world has its economic value more or less fixed, with the exception of the most valuable thing in this world, on which there is no reliable standard of valuation. That is, human life. I have never yet met a parent who would willingly sell me his son for a million dollars with the understanding that I might destroy him, and yet he would not hesitate at times to speak of him as a worthless individual. From these extreme valuations of human life, we have given us by various economists values ranging all the way from $90.00 per capita to $10,000.00 per capita, none of which would be a true estimate in my judgment.

There are only two sources of economic wealth, the man and the soil. It is estimated that the total physical wealth of the United States is $110,000,000,000.00. This is the computed value of all the land and buildings, all the mines and mills and factories, all the railways and other transportation facilities, all the domestic animals and farm products—in fact, everything in the country that possesses a monetary value, except the people themselves. Various economists have estimated that the human life is worth three times the products of the soil, which would make the economic value of all human beings of the United States three times this, or three hundred and thirty billion dollars. We have often heard it said that the cost of the care of and the loss from tuberculosis in the United States annually ranges from one billion, five hundred thousand dollars to nine billion dollars. Stated in broad terms like this the sums are so enormous as to cause some startling mental impression, and then are forgotten.

In this paper I wish to discuss the loss from preventable diseases to a community such as the City of Dayton, and I desire to present it in such a form as to be applicable to any city figured on the same basis as I propose to figure for our city. I do not propose to take into consideration many of the so-called preventable diseases such as arterio sclerosis, abscess, appendicitis, puerperal convulsions, peritonitis, violence, septicemia, epilepsy, etc., but only such diseases as are uniformly recognized everywhere as easily preventable. As a basis of calculation I prefer to take the middle ground and have taken into consideration the age, the character of the disease, the cost of nursing, the loss of wages and the cost of drugs. First to start with the real value of a human being.

Taking as our standards the value of a laboring man it has been shown by various economists that an individual is worth to a community the amount of money upon which his earning power over and above his cost of maintenance would pay 6% interest. In other words, a man earning $700.00 per annum could maintain himself for $440.00 a year, and he would have left from his salary $260.00, which figured at 6% would be the interest on $4,300.00.

You would calculate this value of the human life in the same way that you would calculate the value of a horse, at just what he is worth to the community according to his age and usefulness. This would give you a graded scale in valuation. A child's value would be estimated upon his expectancy and would be a negligible quantity so far as the immediate value is concerned until the age of ten. It has been estimated that a new born baby is worth in expectant value $90.00. At the age of ten he becomes an asset to the community for the reason that he can earn by labor more than enough to pay the cost of maintenance. The average value of a boy at ten is usually estimated at $2601.62. At the age of fifteen he is worth $4263.68 to the community. At the age of twenty-five a laboring man has reached maximum value of $5448.30. At this period he begins to decline, not for the reason that he cannot earn as much as he could earlier, but for the reason that his expectancy is reduced. While his earning power is just as great or even greater at thirty-five than it is at twenty-five, you must provide a sinking fund from his earnings to maintain him after he reaches the age where he cannot labor at all and becomes a liability rather than an asset. It is estimated that a man at the age of seventy is worth to the community $70.13 and that a man at eighty is a liability to the community, of $872.84 for the reason that it will take at least that much to provide an income to maintain him under the most favorable circumstances. These figures are calculated altogether on the value of a laboring man and for economic consideration is the true basis for calculation.

A professional man at the age of twenty-five is worth to the community $25,808.94. At the age of forty $29,344.68, but this is on a speculative valuation.

Taking these figures as presented for the valuation of the human life by ages and calculating the average age of those who died from preventable diseases it is figured that the loss to the community for each death that occurs from a preventable disease is about $3,000.00.

In addition to this it is estimated that the average cost for treating a case of measles including the loss of wages, the cost of drugs and medical attention and the time that it takes from productive labor to care for this case is $10.00 per case. The same valuation is placed on whooping cough and chicken pox. Because of the greater expense for caring for diphtheria; for anti-toxin, the more rigid quarantine, and the loss of wages entailed by the quarantine, the value of a case of diphtheria or membranous croup would be at a conservative estimate $30.00. Scarlet fever $50.00. Smallpox $60.00. Meningitis $100.00. Typhoid fever $200.00. For tuberculosis, the average cost is $3,000.00 and infantile paralysis $3,000.00. The reason for making the cost of the care of tuberculosis and infantile paralysis higher than any other disease are the prolonged time and the duration of the disease in tuberculosis and the necessity during the later stages of the disease of providing so much care and attention, and in a case of infantile paralysis the loss of wage earning capacity as a result of this disease is taken into consideration and brings its cost up to the amount given.

These figures which I consider conservative can be used as a basis on which to calculate the cost of preventable diseases for any community, and for the City of Dayton are as follows:

The cost of nursing, treatment, drugs and loss from labor from preventable diseases:

826	Cases Measles @ $10.00 per case	$8,260 00
78	Cases Whooping Cough @ $10.00 per case	780 00
413	Cases Diphtheria @ $30.00 per case	12,390 00
258	Cases Scarlet Fever @ $50.00 per case	12,900 00
201	Cases Chicken Pox @ $10.00 per case	2,010 00
17	Cases Smallpox @ $60.00 per case	1,020 00
14	Cases Erysipelas @ $25.00 per case	350 00
78	Cases Typhoid Fever @ $200.00 per case	15,600 00
209	Cases Tuberculosis @ $3,000.00 per case	627,000 00
11	Cases Epidemic Meningitis @ $100.00 per case	1,100 00
2	Cases Infantile Paralysis @ $3,000.00 per case	6,000 00
740	Cases Pneumonia @ $25.00 per case	18,500 00
800	Cases Bronchitis, Influenza and Laryngitis @ $5.00 per case	4,000 00
7	Cases Syphilis @ $100.00 per case	700 00
1	Case Tetanus @ $100.00 per case	100 00
500	Cases Gastro-Enteritis @ $10.00 per case	5,000 00
32	Cases Ordinary Meningitis @ $50.00 per case	1,600 00
	Total	$717,310 00

LOSS BY DEATHS ACCORDING TO AGE.

142	Deaths under 1 year @ $90.00	$12,780 00
80	Deaths from 1-5 years @ $750.00	60,000 00
21	Deaths from 5-10 years @ $1,500.00	31,500 00
31	Deaths from 10-20 years @ $4,000.00	124,000 00
55	Deaths from 20-30 years @ $4,500.00	247,500 00
46	Deaths from 30-40 years @ $4,000.00	184,000 00
43	Deaths from 40-50 years @ $3,500.00	150,500 00
47	Deaths from 50-60 years @ $2,500.00	117,500 00
32	Deaths from 60-70 years @ $1,000.00	32,000 00
26	Deaths from 70-80 years @ $100.00	2,600 00
		$962,380 00
	Less 16 Deaths between year 80-90 @ $700.00	11,200 00
		$951,180 00

In these calculations I have not taken into consideration the speculative value of those who follow professions and occupations other than laboring men for the reason that they are not productive and can only be figured on their productive value as laboring men. Neither have I taken into consideration the increased expectancy of life, which would naturally result if these preventable diseases were prevented and death postponed. This as figured by Professor Irving Fisher would result in an increased expectancy of fourteen years for each inhabitant in the community and if figured in dollars and cents for the City of Dayton would give a total of $17,500,000. I mention this grand total of loss not with a view that it will be taken into consideration in our calculations of the preventable losses in the City of Dayton but to meet the argument which may be presented against the following statements.

In the City of Dayton the losses from theft in 1912 were $8,698.53. In 1913 they were $10,390.79. In 1914 they were $34,663.47. In 1912 there were four murders. In 1913 there were six and in 1914 there were seven.

The City of Dayton spends $151,103.18 for maintaining its police force, which consists of 147 men.

In 1912 the fire loss was $121,342.00. In 1913, the calamity year when the flood visited us its loss reached a grand total of $1,391,610.21. In 1914 the fire loss was $330,684.10. In 1912 there were three deaths as the result of fire. In 1913 there were two deaths and in 1914 there were two deaths. They spent for maintenance $166,171.84, in 1914 and employed 149 men.

In 1912 the health work for the City of Dayton amounted to $27,773.00, including two bond issues of $3,000.00 each, and employed sixteen people. In 1913 the City of Dayton spent for health work $33,932.85, including two bond issues of $6,000.00 each, a motorcycle at $250.00 and a typewriter at $100.00, and employed 31 employees. In 1914 the City of Dayton spent for health work $34.443.00 and employed 27 people.

It is as easy to prevent this enormous loss by disease as it is to prevent the loss by fire, theft and murder. One of the greatest handicaps in maintaining an efficient department of health is the lack of money which the community is willing to appropriate for this work, and I believe that the best way to demonstrate the importance of this work to any community is by showing them in cold figures what the community loses in actual money. It has been my observation for many years that you can reach the average business man more easily by showing him the loss in money from disease than yon can by just simply stating that we have had so many cases of preventable diseases, which does not appeal to him for the reason that he is not cognizant of the loss nor of the fact that these diseases are preventable.

One of the arguments that the average business man will present in the comparison of the work of the Health Department and the Fire and Police Department is that if we did not have a Police and Fire Department the losses would be very much greater. This of course is true, but it applies also to the health work and as I stated above the speculative loss from these preventable diseases would reach the enormous sum of $17,500,000.00 annually. This is a sum that is not an usual loss from fire even in the larger cities of the world, and certainly would be almost unheard of in a city the size of Dayton, even if the fires would be allowed to rage without any effort being made to control them. Building construction could be so regulated that fire departments could be eliminated and the annual loss from fire could easily be made good from the loss sustained annually by maintaining the fire department. This argument is just as sane and applies just as forcibly in this connection as it does in connection with the health department work.

In the City of Dayton we had last year about 500 more cases of communicable diseases reported than in any preceding year. We had a decrease of 100 deaths from communicable diseases in 1914 as compared with the preceding years. This at the average cost of $3,000.00 per life means the prevention of an economic loss of $300,000.00.

It has been shown in the health work of our city that where we are able to properly quarantine a patient suffering from a communicable disease we have not been able to trace any subsequent cases directly from that one infected case. It has been frequently our experience that we have traced a number of cases to one that has not been properly quarantined.

Had the City of Dayton given the same attention to prevention of preventable diseases and the postponing of deaths which occur annually from preventable diseases and had they appropriated the same or like amount of money for health work that they did for fire work it is very evident a much greater economic saving would have resulted. This is in no sense to be interpreted as a plea against police and fire protection, but rather a plea for more adequate protection from preventable diseases.

A SURVEY OF INDUSTRIAL HEALTH-HAZARDS AND OCCUPATIONAL DISEASES IN OHIO.

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Ohio State Board of Health.

(*Continued from the May Issue.*)

INDUSTRIES HAVING A KNOWN ASSOCIATION WITH THE USE OF POISONS.

(See Part V and the general index for description of the health-hazardous processes mentioned. It is, of course, undersood that many hazards other than poisoning exist in the various industries here listed.)

AGRICULTURAL IMPLEMENTS.

According to the Census there are 55 firms employing 5,997 wage-earners, or 1.3% of the total wage-earners in the State. Our investigations covered 12 plants, in 6 cities, employing 4,560 wage-earners, of whom 4,499 were males and 61 females. The industry is made up of several processes which are more or less health-hazardous, viz., Iron Founding, Brass Founding, Core Making, Metal Grinding, Forging and Blacksmithing, Machine Shopping, Polishing and Buffing, Wood-working, Painting.

AUTOMOBILES, INCLUDING BODIES AND PARTS.

This industry, according to the Census, includes 75 establishments, employing 12,130 wage-earners, or 2.7% of the total wage-earners in the state. Our investigations covered 34 firms, in 10 cities, employing 17,783 wage-earners, of whom 17,404 were males and 379 were females. The industry is made up of several processes which are more or less health-hazardous, viz., Iron Founding, Brass Founding, Core Making, Metal Grinding, Forging and Blacksmithing, Machine Shopping, Brazing, Soldering, Welding, Polishing and Buffing, Acid Dipping, Pickling, Furnacing, Tempering, Electroplating, Painting and Varnishing, Japanning, Enameling, Lacquering and Shellacing.

BABBIT METAL AND SOLDER.

The Census shows 6 firms employing 74 wage-earners. Our investigations covered 2 firms, in 2 cities, employing a total of 8 wage-earners, all males.—Furthermore, babbitting of journal bearings is an auxiliary process in railway shops and many large plants in the foundry and machine shop, and iron and steel branches of industry.

One of the two plants visited had melting pots well hooded, so that risks from lead poisoning were only nominal. General working conditions were fair. The other plant had no devices for removing lead fumes. Foreman admitted trouble from lead poisoning in the past. General conditions of working very poor. One case of lead poisoning was seen.

BICYCLES, MOTORCYCLES AND PARTS, AND SEWING MACHINES, CASES AND ATTACHMENTS.

The Census gives 10 establishments engaged in this industry, employing a total of 4,773 wage-earners, or 1.1% of the total wage-earners in the state. Our investigations covered 3 establishments, in 3 cities, employing a total or 2,795 wage-earners, of whom 2,685 were males, and 110 were females. The chief processes of health-hazardous character were found to be: Brass Founding, Forging and Blacksmithing, Machine Shopping, Brazing, Tempering, Metal Grinding, Polishing and Buffing, Acid Dipping, Electroplating, Wood-working, Painting and Varnishing, and Enameling.

BOXES, FANCY AND PAPER.

The Census reports 46 firms employing 2,530 wage-earners, or 0.6% of the total wage-earners in the state. Our investigations covered 4 firms, in 4 cities, employing 581 wage-earners, of whom 351 were males and 230 females. Outside of general factory processes the industry was found to have the following processes of health-hazardous character: Wood-working, Gluing, Painting and Varnishing, Shellacing and Lacquering, Staining, Bronzing, Printing.

BRASS AND BRONZE PRODUCTS.

The Census shows 82 firms in this industry, employing 2,232 wage-earners, or 0.5% of the total wage-earners in the state. Our investigations covered 55 firms, in 6 cities, employing 4,532 employes, of whom 4,450 were males, and 82 females. The industry consists of several health-hazardous processes, of which the following are the chief: Brass and Bronze Founding, Core Making, Metal Grinding, Polishing and Buffing, Machine Shopping, Forging and Blacksmithing, Soldering, Brazing, Furnacing, Pickling, Acid Dipping, Electroplating, Painting and Varnishing, Shellacing and Lacquering, Enameling. Japanning. In addition, some plants were concerned in Iron Founding.

According to the Vital Statistics Reports for the State of Ohio, for the years 1910, 1911 and 1912, there were reported 43 deaths of Brass Molders and Brass Workers, of whom 14 died of pulmonary tuberculosis, or 32.72% of their total deaths. While the number of total deaths reported is small, the high rate of consumption is in harmony with observations concerning this industry reported elsewhere. This rate is to be compared to the pulmonary tuberculosis death rate of all occupations in the state combined, for the same years, which was 13.3%, and is also to be compared to the pulmonary tuberculosis death rate of those engaged in Agricultural Pursuits during the same period, which was 7.13%.

Tables submitted by the General Secretary-Treasurer and Editor of the Brassworkers' (Metal Polishers, Buffers, Platers, Brass and Silver Workers) Union of North America for the 5 year period from 1909 to 1914, covering the death claims paid, show the chief causes of deaths, numbers and percentages to be as follows:

Cause.	*No.*	*Per cent.*
Tuberculosis	77	31.9
Pneumonia	31	12.9
Heart Disease	31	12.9
Violence (including 6 suicides)	19	7.9
Other preventable deaths	20	8.0
Other Deaths from Degenerative Diseases	57	23.5
Permissible deaths	7	2.9
Total	242	100.0

The following quotation is from the letter accompanying the tables:

> "You will note from the report, the large percent of our members that die from Pulmonary Tuberculosis. All of these deaths we believe were contracted by working at this trade, but the sad feature is that at least 95% of those that contract Consumption, working at our dangerous trade, will not acknowledge they have the disease until they are too far gone for recovery. They then quit the trade and try to get a position out in the air, often as collectors, driving laundry wagons, or a farm, or, if fortunate enough, go West. These we believe eventually succumb to the disease contracted while working at the trade. We lose all track of them and have no record. If it were possible to keep this record, the percentage of deaths in our trade would be enormous."

The average (median) age at death of the 242 brassworkers was 40.1 years, while for those who died of tuberculosis it was 37.27 years. (Since this is a long-period occupation the median age at death has some significance.) Hence occupation cut off about 21 years from the expected life of each worker when he began to learn the trade at 16 to 18 years of age.

CARRIAGES, WAGONS AND MATERIALS.

The Census shows 407 establishments engaged in this industry, employing 8,815 wage-earners, or 0.2% of the total wage-earners in the state. Our investigations covered 53 establishments, in 11 cities, employing a total of 2,484 wage-earners, of whom 2,443 were males and 41 females. The chief processes of health-hazardous character were found to be: Wood-working, Forging and Blacksmithing, Machine Shopping, Metal Grinding, Acid Dipping, Electroplating, Shellacing and Lacquering, Painting and Varnishing, Staining, and Upholstering.

CARS MADE BY RAILROAD COMPANIES.

The Census shows 71 establishments employing 20,728 engaged in both the construction and repair of cars by steam railroad companies, and 49 establishments employing 1,318 wage-earners engaged in general shop construction and repair by street railroad companies. The two classes combined employ 4.9% of the total wage-earners in the state. A large amount of this work is carried on in the open, or in very openly constructed buildings. The vast percentage of it is general repair and round-house work, in which health-hazards are only nominal. Our investigations covered 6 establishments, in 4 cities, employing a total of 5,534 wage-earners, all males. The chief health-hazardous processes were found to be: Forging and Blacksmithing, Brass Founding, Machine Shopping, Soldering, Tinning, Storage Batteries (repairing), Wood-working, Painting and Varnishing, Shellacing and Lacquering, Welding, Babbitting.

CARS NOT MADE BY RAILROAD COMPANIES.

The Census shows 10 establishments so engaged, employing 3,016 wage-earners, or 0.7% of the total wage-earners of the state. Our investigations covered 7 firms, in 7 cities, employing a total of 6,464 wage-earners, of whom all except 5 were males. The chief health-hazardous processes were found to be the same as for Cars Made by Railroad Companies *(v. s.)*.

CASH REGISTERS AND CALCULATING MACHINES.

The Census shows 8 establishments so engaged, but the number of wage-earners is not stated. Our investigations covered 5 establishments, in 2 cities, employing 7,472 wage-earners, of whom 6,940 were males and 532 females. The chief processes of health- hazardous character were found to be: Brass Founding, Forging and Blacksmithing, Machine Shopping, Metal Grinding, Polishing and Buffing, Tempering, Pickling and Acid Dipping, Electroplating, Sandblasting, Wood-working, Painting and Varnishing, Shellacing and Lacquering, Electrotyping, Printing.

CHEMICALS.

The Census gives 33 establishments engaged in the manufacture of chemicals, employing 1,132 wage-earners, or 0.3% of the total wage-earners in the state. Our investigations covered 4 establishments, in 3 cities, employing 1,101 wage-earners, of whom 1,100 were males and 1 a female. The balance of the establishments are small firms. The following were found to be the chief health-hazardous processes of this industry: Chemical Manufacturing, Forging and Blacksmithing, Machine Shopping.

COFFINS, BURIAL CASES AND UNDERTAKER'S GOODS.

The Census gives 24 establishments engaged in this industry, employing 1,245 wage-earners, or 0.3% of the total wage-earners in the state. Our investigations covered 8 firms, in 5 cities, employing a total of 922 wage-earners, of whom 745 were males and 177 were females. Some of these establishments make only wood coffins, others metallic burial vaults and metallic coffin trimmings. The following processes were found to be the chief ones of health-hazardous concern: Founding (see Brass), Metal Grinding, Polishing and Buffing, Machine Shopping, Welding, Soldering, Electroplating, Engraving, Woodworking, Sewing, Painting and Varnishing, Shellacing and Lacquering.

COPPER, TIN AND SHEET-IRON PRODUCTS.

The Census gives 221 establishments engaged in this rather ambiguous industry, employing a total of 6,598 wage-earners, or 1.5% of the total wage-earners in the state. Our investigations covered 8 establishments, principally tin can and galvanized can manufacturers, which we have classified under this heading, located in 5 cities, employing a total of 1,307 wage-earners, of whom 840 were males and 467 were females. The chief processes of health-hazardous character were found to be: Tinning, Galvanizing, Soldering, Machine Shopping, Welding, Polishing and Buffing, Acid Dipping, Pickling, Electroplating, Painting and Varnishing, Enameling, Japanning, Lithographing.

CUTLERY AND TOOLS.

The Census gives 70 establishments engaged in this industry, employing a total of 2,820 wage-earners, or 0.6% of the total wage-earners in the state. Our investigations covered 25 establishments, in 6 cities, employing a total of 4,202 wage-earners, of whom 3,949 were males and 253 were females. The chief processes of health-hazardous character were found to be: Brass Founding, Iron Founding, Forging and Blacksmithing, Tempering, Welding, Furnacing, Hot Shaping (Iron), Metal Grinding, Machine Shopping, Polishing and Buffing, Sandblasting, Pickling, Acid Dipping, Electroplating, Tinning, Woodworking, Painting and Varnishing, Enameling, Etching.

DRY CLEANING AND DYEING.

This non-manufacturing industry is not, of course, included in the Census reports. Our investigations covered 27 establishments, in 6 cities, employing a total of 698 wage-earners, of whom 263 were males and 435 were females. The chief processes of health-hazardous character were found to be: Dry (and Steam) Cleaning, Dyeing, Ironing and Pressing, and Carpet Cleaning. In addition, one establishment was engaged in laundry processes and another in the manufacture of rugs.

ELECTRICAL MACHINERY, APPARATUS AND SUPPLIES.

The Census gives 115 establishments, employing 8,073 wage-earners, or 1.8% of the total wage-earners in the state. Our investigations covered 29 establishments, in 11 cities, employing a total of 8,982 wage-earners, of whom 6,576 were males and 2,368 were females. The chief processes of health-hazardous character were found to be: Brass Founding, Iron Founding, Core Making, Forging and Blacksmithing, Metal Grinding, Polishing and Buffing, Machine Shopping, Soldering, Tempering, Pickling, Acid Dipping, Electroplating, Sandblasting, Furnacing, Storage Battery Manufacturing, Dry Battery Manufacturing, Wood-working, Mixing Chemicals, Shellacing and Lacquering, Painting and Varnishing, Incandescent Lamp Manufacturing, Pottery Processes.

ELECTROPLATING.

The Census gives 29 establishments engaged in this industry, employing a total of 205 wage-earners. Our investigations covered 8 establishments, in 5 cities, employing a total of 110 wage-earners, all males. In addition, electroplating processes have been considered elsewhere in connection with a great many lines of industry. The chief processes of health-hazardous character are: Metal Grinding, Polishing and Buffing, Acid Dipping, Electroplating, Shellacing and Lacquering.

ENAMELING AND JAPANNING.

The Census gives 5 establishments in this industry, employing a total of 145 wage-earners. Our investigations covered 5 establishments, in 3 cities, employing a total of 115 employes, of whom 102 were males and 13 were females. The chief processes of health-hazardous character were found to be: Furnacing, Machine Shopping, Acid Dipping, Pickling, Mixing Chemicals, Sandblasting, Enameling, Painting and Varnishing, Japanning.

ENGRAVING AND DYE-SINKING.

The Census gives 8 firms engaged in this process, but the number of wage-earners is not stated. However, engraving is a process associated with a number of industries and figures cannot be considered at all representative. Our investigations covered 5 establishments, in 3 cities, employing a total of 105 wage-earners, 95 of whom were males and 10 were females. The chief processes of health-hazardous character were found to be: Engraving, Chemical Processes (Photography), and sedentary work in the nature of Designing and Illustrating. (See also Photo-Engraving.)

EXPLOSIVES.

The Census gives 11 establishments in this industry, employing 358 wage-earners, or 0.1% of the total wage-earners in the state. Our investigations covered 7 plants, in 7 city vicinities, employing a total of 994 workers, of whom 755 were males and 239 were females. (These figures include one large ammunition factory, the majority of whose employes were not concerned with explosives directly.) The chief processes of health-hazardous character were found to be: the Manufacture of Explosives, in addition to which were Founding (see Brass). Machine Shopping, Soldering, Wood-working, and Painting and Varnishing.

FERTILIZERS.

The Census gives 27 establishments in this industry, employing 841 wage-earners, or 0.2% of the total wage-earners in the state. Our investigations covered 10 establishments, in 4 cities, employing 849 wage-earners, of whom 839 were males and 10 were females. The chief health-hazards were found to be: Fertilizer Manufacturing, Oil Refining, Glue Making.

FILES.

The Census shows 7 establishments engaged in this industry, employing 139 wage-earners. Our investigation covered 4 establishments, in 3 cities, employing 108 wage-earners, all males. The chief processes of health-hazardous character were found to be: Tempering, File Cutting, Metal Grinding, Machine Shopping.

FLAVORING EXTRACTS.

The Census gives 37 establishments in this industry. The total number of employes is too small to be mentioned. Our investigations covered 2 establishments, in 1 city, employing a total of 18 wage-earners, of whom 16 were males and 2 were females. The chief health-hazard is Mixing Chemicals.

FOUNDRY AND MACHINE SHOP PRODUCTS.

This industry, which is the first in importance in the state, comprises, according to the Census, 1,218 establishments, employing a total of 64,817 wage-earners, or 14.5% of the total wage-earners in the state. Our investigations covered 47 establishments, in 11 cities, employing a total of 14,484 wage-earners, of whom 13,857 were males and 627 were females. The chief processes of health-hazardous character were found to be: Iron Founding, Brass Founding, Core Making, Forging and Blacksmithing, Tempering, Welding, Metal Grinding, Machine Shopping, Furnacing, Pickling, Tinning, Galvanizing, Soldering, Brazing, Hot Riveting, Mixing Chemicals, Acid Dipping, Electroplating, Babbitting, Polishing and Buffing, Sandblasting, Tumbling, Oil Refining, Wood-working, Painting and Varnishing, Shellacing and Lacquering, Staining, Enameling, Japanning.

According to the Vital Statistics Reports for the State of Ohio, for the years 1910, 1911 and 1912, there were reported the deaths of 605 molders, of whom 110 died of pulmonary tuberculosis, or 18.18% of their deaths. During the same period there were reported the deaths of 1,195 machinists, of whom 224 died of pulmonary tuberculosis, or 18.74% of their deaths. These rates are to be compared to the pulmonary tuberculosis death rate of all occupations in the state combined for the same years, which was 13.3%; and are also to be compared to the pulmonary tuberculosis death rate of those engaged in Agricultural Pursuits during the same period, which was 7.13%.

FUR GOODS.

The Census gives 18 establishments, employing 167 wage-earners. Our investigations covered 4 establishments, in 3 cities, employing a total of 44 wage-earners, of whom 21 were males and 23 were females. No curing of furs was done. The chief health-hazards were found to be: Sewing, and the use of hard-wood dust (oak and mahogany) and corn meal flour to clean the furs. One case of chronic conjunctivitis and blepharitis was reported, due, probably to the effects of this dust. Also it was found that yellow furs were dyed yellow with anilin dyes, used dry. No workers were at the time so employed. Whether this yellow dye is poisonous or not we are unable to state, although saffron yellow and anilin orange are regarded as suspicious or injurious to health. Furs collected in Ohio are "fleshed" and then sent elsewhere for tanning and curing, then returned and made up here. The fur animals of the state are mink, muskrat, skunk, ferret, raccoon, fox and squirrel.

FURNITURE AND REFRIGERATORS.

The Census gives 228 establishments engaged in this industry, employing a total of 8,232 wage-earners, or 1.8% of the total wage-earners in the state. Our investigations covered 19 establishments, in 8 cities, employing a total of 3,953 wage-earners, of whom 3,837 were males and 116 were females. The chief processes of health-hazardous character were found to be: Machine Shopping, Wood-working, Acid Dipping, Electroplating, Brazing, Painting and Varnishing, Shellacing and Lacquering, Staining, Enameling, Gluing, Tinning, Upholstering. (See Wood-working for Vital Statistics.)

GAS, ILLUMINATING AND HEATING.

The Census gives 38 establishments engaged in this process, employing 666 wage-earners, or about 0.2% of the total wage-earners in the state. Our investigations of this industry covered but 2 independent concerns, employing a total of 55 wage-earners, all males, but in connection with a number of establishments the gas-producing plant was investigated. The chief health-hazards of this industry are given under Gas Producing.

GALVANIZING.

The Census gives 5 establishments, but the number of wage-earners is not stated. Our investigations covered 2 establishments, engaged solely in galvanizing, in 2 cities, employing a total of 33 males.

However, the great bulk of galvanized goods are made in Iron and Steel Rolling Mills, where it is reported upon elsewhere. The chief processes of health-hazardous character were found to be: Pickling and Galvanizing.

GLASS.—CUTTING, STAINING AND ORNAMENTING.

(Glass manufacturing is considered elsewhere.)

The Census gives 34 establishments engaged in this industry, but the number of employes is not stated. Our investigations covered 10 establishments, in 4 cities, employing a total of 347 wage-earners, of whom 329 were males and 18 were females. The chief processes of health-hazardous character were found to be: Glass Finishing, Glass Etching, Mirror Making, Sandblasting, Soldering, Electroplating, Painting and Gilding. There is also Transfer Work (Decalcomania), and some Glass Blowing, but only a few so employed.

HATS, FUR-FELT.

The Census gives 3 establishments engaged in this industry, employing a total of 9 wage-earners. Our investigations covered 2 establishments, employing a total of 166 wage-earners, of whom 64 were males and 102 were females. The health-hazardous processes were found to be: Dyeing, Ironing and Pressing, Sewing, Shellacing and Varnishing, also Founding. In addition, the process of Steaming, to shape the hats over molds, was found to be a work largely done by foreigners, who barely understood English, although a fair amount of skill was necessary. There was considerable exposure to humidity, due to steam and vapors of undetermined character, windows being the only method of ventilation. Work was rather warm. Fatigue was more than a moderate hazard, due to piece-work, monotony, constant standing, body pressure, eye-strain and noise. A 9-hour day, with 1 hour off for noon was the rule. The men ate in the workrooms, and there was no medical supervision.

INSTRUMENTS; PROFESSIONAL, SCIENTIFIC.

The Census gives 17 establishments engaged in this industry, but the number of wage-earners is not stated. Our investigations covered 2 establishments, in 2 cities, employing a total of 175 wage-earners, of whom 120 were males and 55 were females. The chief processes of health-hazardous character were found to be: Machine Shopping, Soldering, Welding, Polishing and Buffing, Electroplating, Glass Finishing.

(To be continued.)

GENERAL PROCESSES.

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(*Continued from the May Issue.*)

MIXING CHEMICALS.

There is a distinction to be made between the mixing (or compounding) of chemicals and the actual manufacture of chemical ingredients. While new substances, of course, result from the mixing of chemicals, such processes are not done with the object in view of making new chemicals as products for sale. In a large number of industries certain chemicals are mixed together, or articles are subjected to chemical action, usually by a few workers, for use throughout the plant, or to make up the principal ingredients worked upon. These chemicals may be in the shape of various dry preparations or of liquids or of volatile substances. The best example of this process is the mixing of paint ingredients with various solvents and vehicles, but this particular branch, as well as some others, are so important that we take them up under separate heads. We cite here only a few of the instances in which chemicals are mixed on the grounds of the various establishments: the making of drugs, photography and photo-engraving, the preparation of inks, the grinding of dry colors, cleaning processes by chemical means, the mixing of ingredients for rubber, for enamel, paper goods, railway signals, roofing materials, glass, in the refining of oil, the making of perfumes, etc. The chief exposure to which these workers are liable are poisons, which affect primarily the respiratory and digestive systems, the skin, the eyes, and the eliminative organs. The exposures are largely the result of similar environment and methods, and may all be avoided, more or less, by the same measures.

Compounding or mixing chemicals is here summed up for 20 firms, located in 11 cities, and employing a total of 138 wage-earners, of whom 127 were males and 11 were females. In 14 of these places the methods used were modern from a mechanical point of view. In the remaining 6 they were more or less crude and obsolete. The vast majority of workers were unskilled labor of changing type, often non-English speaking, while the interest manifested in their welfare was usually as nominal as anywhere in the plants concerned. However, in this respect the general attitude toward them seemed good in a total of 13 of the 20 places. In 5 places health appliances were provided and were quite efficient. In 2 places instructions in the care of health were definitely given, while the workers had the benefits of sickness insurance associations in 3 places. The construction of the workplace, as it had a bearing upon the health of the employes engaged in the mixing of chemicals, was good in 14 instances, fair in 2 others, but bad in the remaining 4. In 7 places workers at other processes were exposed to the hazards of this as were these workers exposed to other processes. The age-group estimations for the chemical mixers summed up as follows: over 50 years, 2; between 40 and 50 years, 7; and under 40 years, 129, while probably 5 per cent of the latter were under 20 years.

Dust from the process was a negligible hazard in 7 places, fairly so in 4 more, but bad in the remaining 9. In most instances it was poisonous in character as well as being mechanically irritating. In 11 places quarters should have been kept considerably *cleaner* in order to insure freedom from dust and fumes arising from this source. In 4 instances water, steam, *dampness*, and oils were also features, while in 2 places the *light* was very poor. There was a tendency to relegate this work to basement rooms or out-of-the-way quarters which were often quite uninhabitable when one considers that workers were supposed to spend 8 to 12 hours a day in them. In this respect some 16 places were deficient in *ventilating* arrangements so that the air was more or less continuously vitiated by one or more of the usual causes (deoxidation, contamination, pollution, stagnation, and faulty temperature-humidity relations). In 4 places workers were subject to an undue amount of *heat* while there was the often present risk of catching *cold* through going from hot to cold quarters. *Fatigue* was not a usual feature of this process, although in 2 places it was considered as a hazard. On the other hand, *inactivity* from the sedentary character of the work was a feature in 1 place. The workday for this class of workers was 8 hours in 2 plants, 8¾ to 9 hours in 4 plants, and from 9½ to 13 hours in the remaining 14 places. The noon recess was 1 hour in 1 place, ¾ hour in 6 places, ½ hour in 10 places, while in the remaining plant, in which there were two shifts working 11 hours a day and 13 hours at night, workers were not allowed to leave the plant during the entire shift. The liability to contracting *communicable diseases* was considered negligible in 4 places only. For various places the whole list of sub-factors were present. As these processes were conducted, the risk of *poisoning* seemed negligible with ordinary care on the part of employes in 4 places, and fairly so in 4 more, while, in the remaining 12, the risk was great and depended very largely upon the surroundings and methods used. It is true that in a number of these instances working conditions were satisfactory enough if employes had been informed correctly of the risks of poisoning at hand, and instructed in the avoidance of the same. This responsibility, however, was too often not assumed by the employer. Oftentimes the latter acknowledged he was not posted. The industrial inducement to *stimulantism* (principally *alcoholism*) was present in 16 places and especially so in 5, with the poison hazard as the chief cause and the other hazards of dust, vitiated air, heat, cold, etc., coming in thereafter.

The general *appearance* of chemical mixers was good on the whole in 9 places, but below par in the remaining 11, in which a total of 55 workers were concerned. The health *complaints* and complaints of working conditions by employes were, where English-speaking persons could be interviewed, varied and numerous, and usually checked up very closely with the hazards which our investigators found to be present. A number of cases of *Chronic poisoning* were discovered by our investigators among these workers. It is from this class that a considerable percentage of cases which physicians encounter in their practice are also drawn.

Comments.—Unquestionably the risk of lead poisoning is the chief one of all the poisons concerned, as lead and its various compounds are so universally used. It may be said that there are practically no lead compounds which are harmless, since it has been proven that any and all of them, commonly used in industry, are soluble in the stomach juices and hence only have to be swallowed to become a menace. After lead, benzine or naphtha was probably the next in frequency, and thereafter all manners of poisons both organic and inorganic. Very seldom, of course, did workers suffer from acute or sudden attacks, but the characteristic of most industrial poisons is their slow and progressive action, so that it is only after we look over sickness records and death statistics for numbers of years that the appalling amount of preventable diseases, and deaths from degenerative diseases, become evident. Since 74 per cent of all trades-persons (as shown in Part II) die unnecessary deaths, it is very probable that 90 per cent of the sicknesses as well as deaths among chemical mixers are preventable. Placards, drawn up by qualified health authorities, explaining the slowly acting poisonous nature of these substances and adapted to each trade process, and explaining to foremen and employes how to avoid poisoning, should be posted up in all of these work quarters.

WOOD WORKING.

The various carpenter shop, cabinet making, pattern making, cooperage, and veneering processes, which are all that are intended to be included under the term "wood working", were investigated in a total of 50 establishments employing 2,497 wage-earners, of whom 6 were females. The analysis here given is based upon the various wood working processes in connection with the following industries: Agricultural Implements, Automobiles, Boxes, Carriages, Wagons, Cars, Cash Registers, Cooperage, Coffins, Cutlery, Electrical Apparatus, Foundries and Machine Shops, Furniture and Refrigerators, Iron and Steel Works, Oil Refining, Ship Building, Signs and Advertising Novelties, and Wood Carving.

According to the Ohio Vital Statistics report, there were 852 deaths among Workers in Lumber and its remanufacture during the years 1910, 1911, and 1912. Of this number 93 or 10.91% died of pulmonary tuberculosis. Among Carpenters and Joiners there were 2,358 deaths, of which number 221 died of pulmonary tuberculosis or 9.37%. These rates compare very favorably with that for all occupations combined for the same years which was 13.3%, and even for those engaged in Agricultural Pursuits (7.13%).

The methods observed appeared to be modern in 26 places, fairly so in 18 more, and poor in the remaining 6. The attitude toward employes appeared good in 31 places, and at least fair in the remaining, with the possible exception of one or two where large numbers of foreigners were employed. The general type of workers was fair to good in all except 2 places, while their steadiness in the plants where they were employed was generally good in 36 plants, fair in 6 more, poor in 3 (and not reported upon in the remaining 5). Health appliances, consisting of various blower systems and methods of confining dust, were good in 18 places, fair in 4 more, and absent or very inadequate in 25. In 6 of the places instructions along health lines were found. Benefit organizations covering sickness, and, in some cases, deaths, and pensions were present in 13 places. Most of the workers were skilled hands, but still a large number employed at various auxiliary processes were unskilled labor. Figures on age-groups summed up to show that about ¼ of the total employes were over 40 years of age, while only a few were under 20. Carpenter shops were hygienically well constructed in 13 places, fairly so in 14 more, not so in 17 (and not reported upon in the remaining 6). In about 1/10 of the places other processes were carried on in the same quarters, such as Painting, Machine Shopping, and various factory processes.

Dust, derived from wood, sandpaper, sanding belts, and various machines, was negligible in 6 places, a fair hazard in 15, a bad hazard in 25 (and not reported upon in 2). The floors were kept excellently clean and orderly in 5 places, fairly so in 23 more, and not so in the remaining 22. *Damp* quarters were a health-hazard in 3 places. *Light* was good in 38 places, fair in 8 more, and poor in 3. Workroom *ventilation* was good in 15 places, fair in 21, and poor in 12 places, usually due to an interior or confined location of the carpenter shop. Three places were unduly *hot,* and 2 others fairly so, due to the proximity to other heating processes, the presence of steam chambers, etc. Nine places were not sufficiently heated for winter purposes. Except for the "carpenter's stoop" and certain monotonous piece-work operations, usually requiring constant standing still, the element of *fatigue* was not found to be much of a factor in the processes. The most striking factor was the ear-splitting noises from certain ripping and planing machines. The workday was found to vary between 8 and 10 hours, the usual rule being a 10-hour day, ½ hour noons, and Saturday afternoons off. The liability to the contraction of *communicable diseases* was a considerable hazard in 39 places, the chief reasons being the absence of cuspidors, spitting upon the dusty floors, inadequate washing facilities, poor closets, the use of common drinking cups and towels, and occasionally the crowding together of workers, and dry sweeping during work-hours. Medical supervision obtained in 4 plants; first-aid equipments (particularly for small cuts and bruises) were found present in most all places. *Poisoning* from the woods worked upon was found to be a complaint in 3 plants, but no alkaloidal woods were met with. *Complaints* were made of

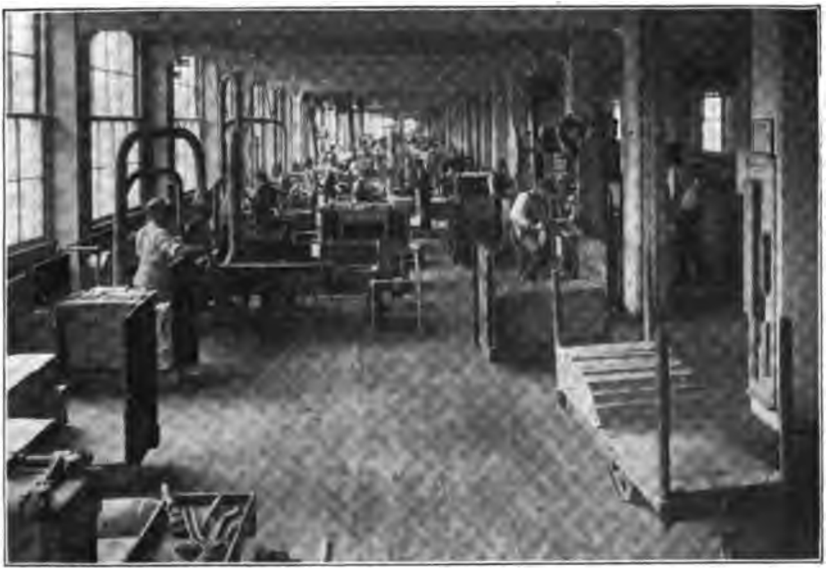

FIG. 46. WOODWORKING SHOP.

Light, spacious. All dust-producing machines have a powerful exhaust system.

"dust bronchitis" and, less often, of the irritating effects of dust from cocobola wood, rarely from walnut and birch. In some instances gas fumes, steam, and oak fumes from drying ovens were complained of. The presence of other processes rendered some workers liable to poisoning from ammonia, gasoline, and wood alcohol, — these in addition to Painting and Sanding. The industrial inducement to *alcoholism* was a matter of dust exposure largely, but in some 16 plants drinking water facilities were quite inadequate.

The physical *appearances* of workers were found to be good for practically all persons in 33 establishments, fairly so in 9 more, and not so in 3. A number of industrially maimed workers were seen. The chief *complaints* of the workers were the necessity of blower systems where such were not provided, and the inadequacy of some which were present; occasionally, also, the poor ventilation of quarters, inefficient heating in the winter, and the presence of fumes and vapors from other processes. In several plants all dust producing processes were found to be excellently well taken care of, the more difficult ones sometimes through the ingenuity of the workers themselves. *Comments.* — Most of the hazards above mentioned define their own preventions. As with other processes investigated, it would appear that there is great need for an engineering bureau to collect the various successful contrivances which have been made to confine dust and to make them available to all. The fact that wood dust is organic and usually non-irritating, except a few of the rarely used woods, probably accounts for the longevity of carpenters and their relative freedom from consumption. However, from one large furniture plant employing many foreign laborers, there were 9 cases of consumption reported during the last six months of the survey when an account was kept of the cases of tuberculosis among workers in that vicinity.

GLUING, PASTING AND LABELING.

The processes indicated in the title are reported upon as investigated in 8 plants, including the following industries: Manufacture of Fancy and Paper Boxes, Patent Medicines and Drugs, Printing and Publishing, Musical Instruments, Paper, Cigar and Tobacco, Regalia and Paint and Varnish Manufacture. In these 8 plants there were a total of 194 wage-earners so employed, of whom 56 were males and 138 were females. Occasionally machine methods were used, but the vast majority of the workers were doing hand work. There were no unions. The general attitude of the employers, the type of the workers, and the steadiness at work places appeared good in all except 1 or 2 places. In two places heated clothes-lockers were provided to enable employes to dry their outer garments in case of rain. In the same number of places some instructions were given along the subject of health conservation. In 1 place the workers had the privileges of an employes' benefit association. In 4 places workers were at least semi-skilled. Workrooms were hygienically constructed in 4 places, fairly so in 3 more, and not so in the remaining 1, while in the case of Cigar Making, especially, other processes were done in the same quarters. There were 18 workers over 40 years, and a considerable number, especially females, under 20 years.

The chief hazard was the licking of labels by a certain number of the employes in different industries, although they were all provided with other means of moistening them. Steaming kettles of glues and pastes produced considerable *humidity* in some places. A number of samples of paste and glues were examined chemically, but no *poisons* (metallic) were found. Some workers, however, were associated with art work (see Printing). Instances were cited where workers were found unable to tolerate the *odors* of hot glue, particularly fish glue. In a number of places *fatigue* was some factor, due to hurrying piece-work, with monotonous and often sedentary application, faulty postures, and, in the case of machine work, jarring processes, and occasionally loud noises. In 1 place the workday was 8 hours; in 1 place, 8½; and in the remainder from 9 to 10 hours. The noon recess was 1 hour in 4 places, ¾ hour in 1 place, and ½ hour in the remaining 3. General sanitary arrangements and workroom hygiene ranged from fair to bad in half of the places investigated; they were good in the remaining. *Comments.* — (See also General Factory Processes.) Labelers run the risk of lead poisoning in paint factories where the filled and sealed cans come to them often finger-marked with fresh paint. The labelers handle the cans (some of them carelessly) and moisten their thumbs in their lips to expedite the handling of the labels. — Likewise, in the tobacco and cigar industry, it is the materials handled (usually by females) which tend to nauseate and produce digestive troubles.

PAINTING AND VARNISHING.

These two processes are usually carried on by the same workers and the terms stand for a variety of sub-processes, which include the brushing on of paint and varnish, filling, rubbing, sandpapering, staining, priming, oiling, dipping by hand or machinery, spraying, stenciling, hand decorating, striping, and polishing. Sometimes the work is associated with shellacing, lacquering, enameling and japanning, but it is not intended to include these here. The indoor painting shops (these only are considered here) were investigated in 127 establishments, located in 15 cities, and employing a total of 2,382, of whom 2,328 were males, and 54 were females. The industries in which painting was investigated were Agricultural Implements, 8; Art Glass, 5; Automobiles, 23; Bicycles and Sewing Machines, 1; Brass and Bronze Products, 2; Carriages and Wagons, 47; Cars, 8; Coffins, 3; Electrical Apparatus, 4; Enameling and Japanning, 1; Foundry and Machine Shop Products, 4; Furniture, 1; Iron and Steel Mill Products, 2; Photo Art Work, 1; Safes and Vaults, 3; Shipbuilding, 2; Signs and Advertising Novelties, 6; Regalia, 1; Toys and Games, 2; Wire Manufacturing, 1.

Ohio Vital Statistics Reports for the years 1910, 1911 and 1912 show a total of 1,025 deaths among "painters, glaziers, varnishers, and paperhangers", of which number 185, or 18.05 per cent died of pulmonary tuberculosis. The figures upon tuberculosis must be regarded as quite conservative, or too low for the class of painters and varnishers (indoor workers) which we are considering here. Also the hazards for glaziers and paperhangers (these workers could not be separated) are much less than for indoor shop painters. The above rates should be compared with the pulmonary death rate for all occupations combined during the same years, which was 13.3 per cent, and also to that for Agriculturists which was 7.13 per cent. Also with Carpenters.

Union organizations existed in 9 of the places investigated. Interest in employes' health and welfare was very manifest in 65 places, fairly so in 30 more, and only questionably so in the remaining 32. An intelligent type of workers were employed in 93 places, fairly so in 25 more, while in 9 they were practically all an ignorant type of foreigners. Apparent endeavors were made to keep the same workers in 90 of the plants, fairly so in 17 more, while little thought appeared to be given to the personnel in the remaining 20. In a total of 17 places, various forms of health appliances were found, consisting of hoods and vents to remove fumes, vapors and dust, and to promote better ventilation in work quarters. These appeared to be efficient in 7 places, fairly so in 4 others, and not so in the remaining 6. In 110 places there was nothing present which could be so designated. In many of these, of course, the work was done in very spacious quarters so that some hazards were correspondingly less. Instructions concerning the dangers of poisoning were well given in 10 places, and fairly so in 7 more, but in the remaining 110 but little attention was given to this, and in some places very crude ideas existed concerning the methods of preventing poisoning. Sick benefit associations existed in 12 places. The general construction of work quarters was hygienically good in 39 places, fairly so in 46 more, and not so in the remaining 42. Other processes were present in about ¼ of the places, such as wood-working, machine shopping, and general factory work. Age-group estimations summed up as follows:

Age Groups.	*No. of Wage-earners*
Over 50 years	82
45 to 50 years	88
40 to 45 years	200
20 to 40 years	1,957
Under 20 years	55
Total	2,382

The work was done without the creation of *dust* and dust was a negligible hazard in 53 places but it constituted some hazard in 23 more, and a bad hazard in the remaining 51. Its danger consisted especially in its lead content. The chief source of dust was the sanding, sandpapering, or dry "rubbing down" of painted surfaces, or surfaces which had been previously lead filled. In the case of some fine work a great many coats of paint were applied on a lead priming coat, and each coat "rubbed down", or sanded by hand. Oftentimes the worker was in a confined space and unable to avoid the dust created. Very often it was impossible to control the dust and keep the worker from breathing it by any other means than the constant wearing of a respirator, to which the workers usually had violent objection. In 31 places premises were kept *clean* and orderly, and fairly so in 54 more, but not so in the remaining 42, so that the paint and dust which was allowed to accumulate constituted a hazard in these proportions. A few places kept floors clean by laying papers down before beginning work. In a total of 16 places *dampness,* due, sometimes, to location of the workroom, constituted a hazard. This was bad in 4 places. Also the process of water rubbing added to it in a number of places. Quarters were naturally well *lighted* in 104 places, only fairly so in 18 more, and not so in the remaining 5. Very often the use of naked electric lamps was depended upon for artificial lighting. Quarters were well *ventilated* in 41 places, fairly so in 45 more, but not so in the remaining 41. The reasons for poor air conditions were contamination with various paint and varnish fumes, chiefly, but also the absence of air-agitators, or room exhaust fans in a large percentage of such places, or a fresh supply of air to workers in confined places (ships, cars, cabinets, vaults, etc.). Quarters were *warm* enough to be of some hazard to health in about 20 places, especially since they were constantly so. Usually, the heat was due to maintaining warm quarters to promote drying of painted and varnished surfaces. On the other hand, quarters were inefficiently heated for winter work in many places. (This does not include the painting of cars which is often practicaly out-door work.) *Fatigue* was some factor in about ⅓ of the places investigated. The reasons for this were, in descending order: hurrying piece-work, monotonous application at the selfsame movements, prolonged standing in one place, and, in a number of instances where workers were seated, no backs to the chairs or stools furnished. The workday was 8 hours in 7 places, 8 to 9 hours in 33 places, 9 to 10 hours in 62 places (and not determined in the remaining 25). The noon recess was 1 hour in 39 places, about ¾ hour in 17 places, ½ hour in 61 (and not determined in the remaining 10). The liability to the contraction of *communicable diseases* was graded in 122 places as follows: negligible, 12; fair risk, 42; bad risk, 68. The chief causes were promiscuous spitting where more or less dust existed, the absence of cuspidors, absence or great inadequacy of wash-places, poor closets, common drinking cups, and towels. Occasionally workers were closely crowded. Also wiping rags from unknown sources and unsterilized were almost universally used. The greatest hazard to health in the process is that of *poisoning*. The principal poisons found were lead (both as dust and in solution in oil and water, or spray, also "kicked up" from dust accumulations), turpentine, benzine, benzol, wood alcohol, creosote and asphaltum. In a number of the industries investigated it was claimed that no lead was used. In others lead was only used at intervals. It is well to mention that drying oils (boiled oil, etc.) often contain lead oxide as the principal drier. A physician called our attention to three cases of severe lead poisoning which he had in a father and two sons who drank some "boiled" oil to relieve constipation. Oftentimes it was impossible to determine all the poisons that might be present, in which case the investigators simply reported "paint", "varnish fumes", "paint removers", etc. However, paint removers were not very much used. Hand rubbing with oil containing a lead drier, and hand polishing with a solution containing wood alcohol (about two quarts to five gallons of mixture) were also noted. There were many predisposing causes to poisoning, the chief being the breathing of dust and sprays containing lead, and of fumes of the various volatile substances used. "No place to wash up before eating", was a common complaint. In one place six men used an old paint can to wash in. Lack of correct information on the prevention of lead poisoning, the idea, held by many, that they bore charmed lives and could not be poisoned, carelessness in eating, eating in the workroom, failure to connect up minor sickness complaints with the existence of slow poisoning, and personal carelessness — these constituted the chief hazards. The industrial inducement to *stimulantism* is considerable for practically all workers engaged in this process, due to the poison elements present, to dust, to nauseating fumes and odors, and the like. Many of these workers go without breakfast because they have no appetite for the same — a sign of lead poisoning (particularly).

The general *appearance* of indoor or shop painters was in the majority of instances below par. In this respect the investigators reported the general average of workers not healthy appearing in a total of 68 plants. In 45 different establishments workmen were found who made various *complaints* concerning the health aspects of the processes in which they were engaged. Arranged in as nearly descending order of frequency as possible, these were: breathing of dust, breathing of fumes, lack of good room ventilation, digestive troubles, attacks of dizziness, personal carelessness, kidney and bladder troubles, and general sanitary inadequacies. Investigators reported 167 cases of *occupational diseases* as follows:

Lead poisoning, positive	90
Lead poisoning, tentative	27
Lead poisoning, partially recovered from	26
Lead poisoning, authentic hearsay cases	10
Lead poisoning, ocular	1
Benzine and Naphtha poisoning	3
Turpentine poisoning	2
Varnish poisoning	2
Wood Alcohol poisoning	1
Bleeding fingers from sanding	1
Dermatitis	2
Tubercular Bronchitis	2
Total	167

In addition to the above, there were large numbers of hearsay cases and other evidence which the Survey did not have the time to investigate further. In some old established places, foremen said that practically all workers ever employed got lead poisoning. In one large place it was said that at times there were "epidemics" of bladder and kidney troubles due to the turpentine and other solvents used. The health officer of Cincinnati, Dr. Landis, called our attention to the harmful effects of certain new paint solvents which were producing a new train of symptoms among painters.

Comments. — Dry rubbing or sanding of painted surfaces should be substituted by wet methods, or with mineral oil, to keep down the dust. Occasionally, local exhausts can be used. Where these are unfeasible, the worker should wear a tight respirator, perhaps supplied with air under pressure, while frequent change from this process to another is essential. Almost the same precautions should be taken in regard to spraying. As much needed as anything are placards informing workers how to prevent lead poisoning, and other health educational measures. Great precaution should be taken to keep quarters clean so as to prevent the "kicking up" of dust. Good washing facilities and insistence upon their use are absolutely necessary. Street clothes and lunch boxes should be kept out of painting quarters. — For vapors, fumes and gases, spacious quarters, air-agitators, local exhaust hoods, blowers and short intervals at such work are suggestions variously adaptable to various places. Finally, there is no other class of workers, from the large numbers employed to the poison factors concerned, which is more in need of a frequent medical examination than indoor (shop) painters.

In a number of instances, as for instance, STENCILING, marking, etc., harmless substitutes could be used for lead and other poison-containing paints, and in a number of instances it was found that lead paints were being used less and less.

In a paper entitled, "The Composition of Paint Vapors" (Jour. Indust. & Engrg. Chem. Vol. VI., No. 2, Feb., 1914) H. A. Gardner, Assistant Director Institute of Industrial Research, Washington, D. C., calls attention to carbon dioxide, *carbon monoxide,* benzol, formic acid, and aldehydic substances, which may be evolved from surfaces covered by drying oil paints. All of these, of course, are toxic substances, and the author's contention that the carbon monoxide may be responsible for the peculiar type of anemia from which painters sometimes suffer is certainly a possibility. The newer forms of quick drying paints are the most likely to yield these substances. (See also Bulletin No. 41, Paint Manufacturers' Association of the U. S.) Ventilation of painting quarters, or quarters being painted, is the only means of avoiding the effects of these substances.

SHELLACING AND LACQUERING.

A shellac is a gum resin produced by an insect on several East Indian trees. The resin is dissolved in ordinary alcohol, denatured alcohol, or wood alcohol, according to its purpose. A lacquer is a thin, highly transparent varnish used to produce a thin, lustrous film on metals, etc., to preserve them against gases and vapors. The process of Shellacing and Lacquering is closely associated with Painting, Varnishing and Staining, and in many instances it is quite impossible to separate them, since the same workers may be concerned with each process. Shellac and lacquer may be brushed or sprayed on, or articles may be dipped into the solutions.

In 32 establishments, in 9 cities, employing a total of 894 wage-earners, of whom 868 were males and 26 were females, the processes of shellacing and lacquering were fairly well separated from the other processes mentioned. General conditions respecting the types of workers, health appliances, construction of workrooms and presence of other processes were practically the same as for Painting and Varnishing.

The hazards of ***dust, dirt, dampness, darkness, heat*** and ***cold,*** were all less than for Painting (warm, light rooms free from dust being a necessity). The condition of the atmosphere in workrooms was good in 14, fair in 19, and bad in the remaining 6 places, due chiefly to contamination with the fumes and vapors emitted from the process, combined with stagnation and temperature-humidity abnormalities. ***Fatigue*** was usually a negligible factor. except that in a few places piecework, monotony, constant standing and faulty postures were observed. The workday was 8 hours in 1 place, 8 to 9 hours in 11 places, 9 to 10 hours in 25 places, and 10 to 11 hours in 2 places. The noon recess was 1 hour in 9 places, about ¾ hour in 7 places, ½ hour in the remaining 23.

Age-group estimations summed up as follows: over 40 years, 195; 20 to 40 years, 671; under 20 years, 28. There was a tendency to employ youths of both sexes. The liability to ***communicable diseases*** was not quite as great as among painters because dust was not so frequent. Various ***poisons*** to which workers were subjected were lead (in boiled oil), turpentine, amyl acetate, wood alcohol, benzine (naphtha), benzol, toluene, acetone (?), "banana oil" and other varnish and lacquer solvents (and varnish removers).

The average *appearance* of workers was generally good in 16 places, fair in 12 more, while pallor, anemia (but sometimes very flushed faces and reddened eyes), and emaciation characterized the remaining 11 places. The chief *complaints* of workers were the effects of turpentine fumes and "varnish" causing (besides dizziness) digestive, respiratory, skin, kidney and bladder troubles. Our investigators found the following *occupational diseases* among workers:

Lead poisoning, positive	4
Turpentine poisoning, tentative	8
Benzine poisoning, tentative	2
Occupational dermatitis, positive	6
Occupational rhinitis	1
Occupational anemia	1
Occupational tuberculosis	1
Occupational nephritis	1

Comments. — See under Painting and Varnishing. It is also questionable whether females should be employed in any processes exposing them to shellac, lacquer, varnish, or polishing fumes. The same may be said of youths.

(*To be continued.*)

INTERSTATE SANITARY DISTRICTS.*

Their Establishment by the Secretary of the Treasury in Connection with the Enforcement of the Interstate Quarantine Laws and Regulations.

To facilitate the enforcement of the interstate quarantine laws and regulations the Secretary of the Treasury has divided the continental United States into districts to be known as interstate sanitary districts. The districts are as follows:

District of the North Atlantic.—That portion of the United States lying east of a line beginning at the junction of the seventy-fourth degree of longitude and the Canada line and extending southward to the forty-second degree of latitude and running west to the seventy-fifth degree of longitude, along which it extends south to the Atlantic Ocean.

District of the Middle Atlantic.—That portion of the United States lying west of the seventy-fifth degree of longitude and bounded on the north and west by a line beginning at the junction of the forty second degree of latitude and the seventy-fifth degree of longitude and extending west to the seventy-eighth degree of longitude, thence south to the fortieth degree of latitude, thence to the eightieth degree of longitude, and thence south to the Atlantic Ocean.

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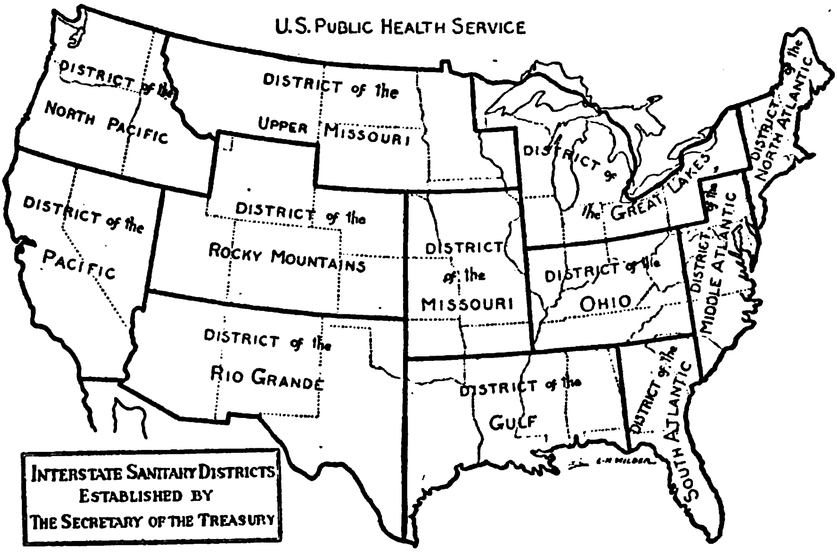
* Public Health Reports 1915,

District of the South Atlantic.—That portion of the United States between the eightieth and eighty-fifth degrees of longitude and south of the thirty-fifth degree of latitude.

District of the Gulf.—That portion of the United States lying between the eighty-fifth degree and ninety-eighth degree of longitude and south of the thirty-fifth degree of latitude.

District of the Ohio.—That portion of the United States lying between the eightieth and ninetieth degrees of longtitude and the thirty-fifth and fortieth degrees of latitude.


U.S. Public Health Service
District of the North Pacific
District of the Upper Missouri
District of the Great Lakes
District of the North Atlantic
District of the Pacific
District of the Rocky Mountains
District of the Missouri
District of the Ohio
District of the Middle Atlantic
District of the Rio Grande
District of the Gulf
District of the South Atlantic
Interstate Sanitary Districts Established by The Secretary of the Treasury

District of the Great Lakes.—That portion of the United States lying north of a line beginning at the junctions of the seventy-fourth degree of longitude and the Canada line, and extending south to the forty-second degree of latitude, west to the seventy-eighth degree of longitude, south to the fortieth degree of latitude, west to the ninetieth degree of longitude, north to the forty-sixth degree of latitude, west to the ninety-third degree of longitude, and north to the Canada line.

District of the Missouri.—That portion of the United States lying between the ninetieth and ninety-eighth degrees of longitude and the thirty-fifth and forty-third degrees of latitude.

District of the Upper Missouri.—That portion of the United States lying west of the sanitary district of the Great Lakes and north of a line beginning at the junction of the ninetieth degree of longitude and the forty-third degree of latitude, extending west to the eastern border of Wyoming, north to the southern boundary of the State of Montana, west to its western boundary, which it follows to the Canada line.

District of the Rocky Mountains.—The States of Wyoming, Utah, and Colorado, and that portion of the States of Nebraska and Kansas lying west of the ninety-eighth degree of longitude.

District of the Rio Grande.—The States of Arizona and New Mexico, and those portions of the States of Oklahoma and Texas lying west of the ninety-eighth degree of longitude.

The District of the Pacific.—The States of California and Nevada.

District of the North Pacific.—The States of Washington, Oregon, and Idaho.

EDITORIAL SECTION.

The Economic Loss from Disease.

Some economists have attempted to work out a satisfactory basis for determining the value of a particular individual to the community. The most satisfactory conclusion which has been reached is that *a person is worth to the community the difference between his or her earning power and the individuals' cost of maintenance, which sum represents 6 per cent of the total value.* For example, a mechanic earning $840 a year spends on the average $540 for maintenance. The difference between maintenance and amount earned in this instance is $300. Three hundred dollars is 6 per cent of $5,000, which would, therefore, be regarded as the value of that particular mechanic to the community. In a similar way the value of any business or professional man may be estimated. It should be borne in mind, however, that there are certain variable factors, such as age and physical condition, which must be considered, the same as when rating the value of other breeds of live stock. Such computations must include also a consideration of life expectancy at certain age periods. It has been shown, therefore, that the value of a new born babe based on its life expectancy is very low being about $90 to $100. A child must be regarded as a distinct liability to the community until such time as it reaches an age when it can by its own labor support itself and pay for the cost of maintenance. This age is supposed to be between ten and twelve years, after which the child becomes an asset to the community because of his or her ability to produce more than the cost of maintenance, which difference can be figured, as above mentioned, on a basis of being 6 per cent of the total value. All computations on this basis, as previously stated, include the factor of life expectancy. Thus we find that the maximum value of laboring men, including mechanics and business and professional men, is reached at from twenty-five to thirty years. It is quite true that the productiveness of the individual after this time may be greater than before, but the life expectancy is decreased from year to year after this period. Later on all working people reach an age when they cannot labor and at such time they become a liability again to the community. Thus at the age of seventy to eighty the average individual is worth about the same amount as he or she was at birth and after this time the liability to the community may be estimated in dollars and cents just the same as assets were estimated in the earlier period of life. It is obviously necessary, therefore, for all individuals to save a certain amount of the funds during their most productive periods and to use all possible means to increase their life expectancy to the full limit. They should create, as some one has suggested, a sinking fund, which will maintain them after the time when they become a liability to the community. Dr. Light presents an interesting discussion in this issue on the economic loss to Dayton from preventable diseases.

* * *

The Influence of a Pure Water Supply on the Typhoid Rates.

That much may be accomplished in those communities which pay attention to matters of public health is well illustrated by the typhoid fever death rates in certain cities of the United States having over 100,000 population. For example, among the eight cities in the United States of over 500,000 population, the following death rates for typhoid fever are the most interesting.

	1906-1910	1911-1913
New York	13.8	9.3
Boston	16.0	8.6
Chicago	15.5	9.6
Cleveland	16.5	11.4
Philadelphia	42.1	14.1
St. Louis	16.1	14.2
Pittsburg	74.3	18.5
Baltimore	34.6	24.9

The typhoid fever death rate in the city of New York for the year 1913 was 7 per 100,000 population, notwithstanding the fact that there was a milk-borne epidemic during this year. This was the lowest typhoid fever death rate ever experienced by the city of New York. An epidemic of typhoid fever also occurred in the city of Philadelphia during 1913 in that portion of the city supplied by the Torresdale filters. It was noted in this instance, for example, that the filtered water was pure but that certain industrial connections had been made and that the polluted water of the Delaware River was used by many plants along with the public supply, eventually becoming mixed with the public supply and thereby polluting the water mains. During 1913 the death rate in Cleveland from typhoid fever was 13.5 as against 5.9 per 100,000 population in 1912. The water supply from Cleveland is obtained from Lake Erie and hypochlorite of lime is now used in treating this supply. At the present time Cleveland is installing under the direction of the State Board of Health an extensive system of water filtration plants. There was also an increase in the typhoid fever death rate in Chicago during 1913 due to the pollution of the water supply. The annual saving of lives to the city of Pittsburg since the introduction of the filtration plants has been about 400.

In the group of cities in this country with a population of 300,000 to 500,000 the following typhoid fever death rates obtain:

	1906-1910	1911-1913
Cincinnati	30.0	8.5
Newark, N. J.	14.6	8.4
Milwaukee	27.0	18.6
Minneapolis	32.2	11.8
Los Angeles	19.0	13.6
Buffalo	22.8	17.3
Washington, D. C.	36.9	19.5
San Francisco	27.3	15.5
New Orleans	35.6	20.5
Detroit	23.4	20.1

These cities as in the larger cities are arranged in the increasing order of their typhoid death rate for 1913. During this year Cincinnati had the lowest rate, namely, 6.4 per 100,000 population. Cincinnati has a most modern and efficient filtration plant which purifies the water of the Ohio River.

Among the group of cities in this country with a population over 200,000 and under 300,000 it is noted that Seattle had a typhoid death rate of 4.9 per 100,000, which is the lowest, and Indianapolis a rate of 24.5 per 100,000, which is the highest in this group.

Among that group of cities with a population of 125,000 to 200,000 the typhoid death rate was lowest in Scranton, Pennsylvania, being 6.4 per 100,000 population. The City of Toledo had the highest rate in this group, being 41.8 per 100,000. This was due principally to the extended use of shallow wells. The typhoid death rate in Columbus, in 1913 was 19.03 per 100,000 population.

Among the cities having a population of 100,000 to 125,000 the lowest typhoid fever death rate was in Bridgeport, Connecticut, being 5.4 per 100,000 and the highest 36.1 per 100,000 in Nashville, Tennessee. Dayton, Ohio, belongs to this group of cities and the typhoid fever death rate in this city has remained stationary at 15.1 per 100,000 for several years.

It is a well known fact that typhoid fever is primarily a water-borne disease. It may be acquired, however, in other ways, namely, through infection of food supplies and contact with typhoid fever germ carriers. The normal typhoid fever death rate is estimated to be about 10.0 per 100,000 population. It will be noted that the rates in a considerable number of cities in this country are much below the so-called normal rate. It will also be noted that a considerable number of cities are above the normal rate but that their rates have been materially reduced in recent years. The fact stands out very prominently that in those cities which have given attention to the securing of a pure water supply, the rates have been materially reduced. Conversely, in other cities where sufficient attention has not been given to this important phase of sanitary science the rates have not been materially reduced.

In this connection reference should be made to the phenomenon which was pointed out by Mills and Reincke, and known now as the Mills-Reincke Phenomenon. These gentlemen showed that the typhoid fever death rate was not alone affected by the installation of a pure water supply in a community, but that the incidence of general diseases was materially reduced. Hazen, who has carefully studied the statistics collected in all parts of the world, has noted the fact that for every case of typhoid fever which is prevented when a pure water supply is installed, two other general diseases are also prevented. That is, the ratio of reduction in general diseases as compared with typhoid fever is about two to one. This determination ratio is now known as Hazen's Theorem.

* * *

Division of Occupational Diseases Changes Title.

At the last meeting of the Ohio State Board of Health, the title of the "Division of Occupational Diseases" was changed to that of "Division of Industrial Hygiene". Such a change has, for sometime, appeared both opportune and logical. Heretofore the work of this Division has been preeminently concerned with the question of industrial hygiene. This has been due to the wording of the principal law, which, while entitled "Joint Resolution Authorizing and Directing the State Board of Health to Make an Investigation of Occupational Diseases", specified that the Board was to "Make a Thorough Investigation of the Effect of Occupations Upon the Health of Those Engaged Therein With Special Reference to Dust and Dangerous Chemicals and Gases, to Inefficient Ventilation and Lighting, and to Such Other Unhygienic Conditions, as in the Opinion of Said Board May Be Specially Injurious to Health". It is true that a good share of the activities of this Division has been devoted to the investigation of cases of occupational diseases, but as these can only exist because of faulty industrial hygiene, it appears decidedly more logical to name a bureau or division of this sort with the idea of the prevention of *cause* rather than the prevention of *effects*. There are undoubtedly but few of the effects (i. e., occupational diseases) of faulty hygiene in industry which have come to the surface, and it may be safely assumed that any steps which may be taken to remedy faulty industrial hygiene will result in a general improvement similar to that of the Mills-Reincke phenomenon which brought out the fact "that the filtration and improvement of polluted water supplies result in a reduction of the general death rate to an extent greater than can be accounted for by the reduction in the death rate from typhoid fever alone". Thus, where one death from typhoid fever has been avoided by the use of better water, a certain number of deaths, probably two or three, from other causes (Hazen's theorem) have also been avoided.

The new title greatly enlarges the viewpoint of the activities of this Division, even though a good portion of its work has been much more extensive than that concerned with occupational diseases as such. Furthermore, the change is laudable, since it is in harmony with the functions of a public health office, that is, prevention of disease rather than simply control of the same.

It is a greatly disputed point today where industrial hygiene belongs in state administration, that is, whether it is a department for a board of labor and industries or a board of health. There is a tendency throughout this country to conduct it through the former of these two because of the intimate relationship which the service then has with the factory inspection department, whose function, of course, is the supervision, primarily, of safety appliances, to which have been added more or less exclusive powers concerning the supervision of the health and welfare of employes.

On the other hand, the fact that occupational diseases have continued to multiply in spite of the broad powers given most factory inspection departments in regard to questions of hygiene and sanitation is proof-positive that the subject is quite beyond them, at least as most of them are at present organized. There is something more to the prevention of diseases than a layman's supervision of the same, as might be expected. The services of the skilled sanitarian are required in a problem as vast as this, with, indeed, the close cooperation of physicians and all treating agencies as well, if there is to be a real progress made in prevention. Unquestionably, the control of industrial hygiene must be put in the hands of a board or commission with broad powers and facilities for unlimited investigation and advisory capacities, so that the question is not one of whether such a department belongs to the department of factory inspection or the department of health. The functions of both must be carried out, with the policing powers of the former combined with the knowledge of the cause and prevention of disease, which is the chief tenet of the latter

It would appear that in some industries the control by the industry itself has been quite successful, but even here the intimate relationship between industrial hygiene and home, personal and public hygiene, necessitate a broader supervision, and when we finally acknowledge that the whole is a matter of education, it seems most logical to conclude that the health department, which is in close affiliation with a leading educational institution, such as the state university, and which has broad powers in the matter of the enforcement of its orders, rules and regulations, is in the best position to meet the many problems which arise.

* * *

Improved Methods for Cleaning the Streets.

It is remarkable that along with the rapid advancements which have been made in all lines of human endeavor, and especially in methods to do away with drudgery and menial labor, as well as to improve our sanitary conditions, that we still have with us the old fashioned push-broom, and, in some of our larger cities, the revolving brush vehicle as the means almost universally adopted for the cleaning of our best thoroughfares. Along with such advancements as the continual sprinkling of streets, the oiling of miles and miles of others, and even the laying of expensive brick pavements along the country roads, we appear to have made very little progress in the adoption of conveniences in the matter of keeping our streets clean. Only a few months ago two of us were completely enveloped in a cloud of dust while traversing a principal street in a large city in Ohio, where ten or twelve laborers were busily engaged with push-brooms on a dry pavement. Pedestrians, open windows and doors in the vicinity, and the occupants and contents of buildings had no protection from the clouds of dust which were raised. The workers themselves were also without any protection from the dust, either through previous sprinkling of the thoroughfare, or by the wearing of respirators or other means.

In another city, after eleven o'clock at night, a crew of men was observed with a horse-drawn vehicle carrying two or three immense brushes placed somewhat obliquely and wide enough to cover about one-fourth the width of the street. The brushes simply swept everything toward one side, and created an immense amount of dust, which, of course, entered bedroom windows of hotels and such residences as were in the vicinity during the sleeping hours of the inmates.

Such a situation is a travesty upon society's care of itself.

We publish on another page of the present issue a short article concerning one of the means of improvement in this matter, that is, the adoption of the vacuum cleaning principle to street cleaning. Along with expensive fire apparatus, and police and ambulance vehicles, there seems no legitimate reason why funds could not also be expended for any purpose which has convenience, cleanliness, protection from disease, and purification of the air which enters our buildings, to recommend it,—in fact such is a necessity.

* * *

Still Unknown.

An excellent list of books on the prevention of disease has recently been issued by the Council on Health and Public Instruction of the American Medical Association, in which some two hundred authors' names appear, and a slightly greater number of titles, and, in addition, reference to some principal pamphlets, circulars and reprints. These have been classified under the following headings:

Eugenics,
Child Hygiene,
Abnormal Children,
Personal Hygiene,
The Eye and the Ear,
Hygiene of Women,
Social Hygiene,
Mental and Nervous Hygiene,
Fresh Air, Exercise and Rest,
Communicable Diseases,
Pure Foods and Digestion,
Miscellaneous.

The largest number of authors and titles appears under child hygiene, social, sex and personal hygiene. The selections appear to be especially well made, and have been compiled by the Committee on Medical Literature of the Committee on Public Health Education Among Women.

It is a strange fact, however, that there is no mention made of industrial hygiene, nor of occupational diseases. A search through the titles discovers one work, "The Report of the President's Homes Commission", otherwise known as "Industrial and Personal Hygiene", a government publication, by Dr. George M. Kober, issued in 1908. Under the heading "Fresh Air, Exercise and Rest", is also found mentioned Josephine Goldmark's "Fatigue and Efficiency". There is, however, contained no mention of the dozen or so recent publications in English, of more or less extensive character, which have appeared in the field commented upon, while 800 or more titles, listed under the head of "Bibliography on Industrial Hygiene", and making up 48 pages of Volume II, No. 2, of the American Labor Legislation Review, June, 1912, appear to have been entirely overlooked; also the greater part of two or three volumes devoted to the subject in the Transactions of the XVth International Congress on Hygiene and Demography, held in Washington, September, 1912. Indeed, an International Congress on Industrial Hygiene was to have been held in Vienna, September, 1914. The program for this had been completed when the war began, which, however, necessitated its indefinite postponement.

It would appear from the above that a page or two might have been devoted to this subject, which is occupying so much attention of legislatures, industrial commissions, economists, and which is of so vital an interest to the welfare of our people in America today.

THE DOCTOR'S DUTY AS A CITIZEN.

The city looks to the physicians of Toledo for something. The people expect the physicians to do their duty as citizens in their medical capacity, as required by law, even though there be no fee attached.

State law and city ordinance require that the attending physician in a case of typhoid, which is a preventable disease, shall report the case immediately to the health authorities, with such information as may be useful to that department in furthering the health of the city by ascertaining the source and taking means to prevent the spread of the disease.

That is the plain public and professional duty of the physician, and its neglect is an offense and a sin against the community in which he lives.

Last month 58 cases of typhoid were reported to the health authorities from the entire city, yet in the Third ward alone the latter have found 55 cases. Evidently some Toledo physicians are not doing their duty.

The physician has been the beneficiary of numerous laws. He is regarded as a personage of peculiar civic value. It was through the appeals and desires of the physicians, largely, that the recent changes in the health department were made, in order that contagious, infectious and preventable disease might be more efficiently dealt with.

It is surely up to the physicians to make good and to show their public spirit by complying with this law of reporting all cases as required in the interest of the pubic health. They have the organization that enables concerted action along this line.

There is a penalty of fine or imprisonment for failure to report, but that should not be necessary to ensure the performance of so plain a public duty.—*Toledo News-Bee*, June 4, 1915.

PUBLIC HEALTH ACTIVITIES IN OHIO.

Ohio State Public Health Exhibit.

The proposed normal school schedule of the Ohio State Public Health Exhibit is as follows:

State Normal School, Kent	June 22-June 25
Ohio State University, Columbus	June 29-July 2
Ohio University, Athens	July 6-July 9
Miami University, Oxford	July 13-July 16
Horace Mann School, Yellow Springs	July 20-July 23

Upon the completion of this schedule, the exhibit will return to Columbus in order to prepare for a tour of the county fairs. The itinerary of the exhibit was printed in the May number of the Journal.

Public Health Organizations.

On May 21 the Belmont County Anti-Tuberculosis Society held its annual meeting and elected the following officers for the ensuing year: president, Dr. J. C. Archer, Shadyside; vice-president, Mrs. R. A. Blackford, Martin's Ferry; secretary, Miss Stella Tappan.

On May 22 the Tiffin Public Health League was organized with the following officers: chairman, Russell Knepper; vice-chairman, Mrs. John Pierson; secretary, Mrs. William Miller; treasurer, Earl Knapp.

On May 29 the preliminary steps in the organization of the "Portage County Public Health and Child Welfare League" were taken at a meeting held in Ravenna with representatives from various sections of the county.

At the annual meeting of the Anti-tuberculosis League of Scioto County held in Portsmouth on June 2d the following trustees were elected: Simon Labold, Dr. L. G. Locke, Dr. Charles Wendelken, Frank L. Marting, Judge Harry Ball, Mrs. G. W. Grimes, and Mrs. J. L. Treuthart.

The fifteenth annual meeting of the Ohio Society for the Prevention of Tuberculosis was held on June 7 at the Chittenden Hotel, Columbus. Preceding the business session, a luncheon was served to those in attendance as guests of the Society. Dr. Charles J. Hatfield, Executive Secretary of the National Association for the Study and Prevention of Tuberculosis, was the guest of honor and addressed the meeting on the "Relationship between the National and State Organizations." Dr. E. F. McCampbell, Secretary and Executive Officer, Ohio State Board of Health, reviewed the development of the anti-tuberculosis work in the state.

The election resulted as follows: president, Rev. D. Frank Garland, Dayton; 1st vice-president, Dr. H. E. Welch, Youngstown; 2d vice-president, Miss Clara P. Southward, Circleville; secretary, Mr. Robert G. Paterson, Columbus; treasurer, Mr. A. W. Mackenzie, Columbus; auditor, Mr. Charles L. LaMonte, Columbus; Chairman Red Cross Seal Committee, Mr. S. Livingston Mather, Cleveland.

There were ninety-seven members present from thirty-five cities of the state. It was the most successful meeting in the history of the Society.

Public Health Nurses.

Miss Alta C. Barnes, assistant traveling nurse employed by the Ohio Society for the Prevention of Tuberculosis, completed her second month's work in Bellevue on April 23. On May 3 she was employed as permanent nurse by the Salem Public Health League.

Miss Elizabeth Davison, traveling nurse employed by the Ohio Society, completed her work in Tiffin on May 22 and from there went to Delphos where she will remain one month.

At a meeting held in Columbus May 26, the Ohio Graduate Nurses' Association nominated the following ten nurses from which the State Medical Board will select three to constitute a Nurses' Examining Committee under the provision of the Nurses' Registration Law, recently enacted:

Jane L. Tuttle and Augusta Condit, Columbus; Grace Noble, Cleveland; Elizabeth Cocke and Miss Wilson, Cincinnati; Anza Johnson, Springfield; Miss Friend, Dayton; and Marie Lawson and Anna Gladwin, Akron.

In the 1914 annual report of the Cincinnati Municipal Tuberculosis Sanatorium, Dr. A. C. Bachmeyer, Superintendent, recommends increases in the nurses' salaries on the ground that the nurses in the work are subject to danger of infection and they should be compensated, in a measure, in proportion to the risk.

Tuberculosis Hospitals.

The amount of $30,000 was decided on as a tentative sum to be set aside by the joint boards of county commissioners now discussing the proposed district hospital, for the purchase of a site and the erection of an administration building, at a meeting held on May 28 in Chillicothe.

Commissioners from Fayette, Pike, Ross, and Scioto counties voted for this sum. This was done for the purpose of giving Fairfield and Highland counties a chance to figure on the proposition. This amount may be added to the first year, if necessary. The levy was to be decided on before the first of June.

Commissioners from Pike, Scioto, Fairfield, Ross, Fayette, and Highland counties were present at the meeting. Dr. R. G. Paterson of the state department of health and Dr. G. E. Robbins of the Ohio Society for the Prevention of Tuberculosis were also present. While Jackson county was not represented, indications are that it is favorable to the proposition. Dr. Robbins made an eloquent plea for the hospital.

On a six county basis, the cost per county will be as follows: Ross, $5,065; Fairfield, $6,300; Highland, $3,250; Pike, $1,180; Scioto, $5,530; Fayette, $4,100. On an eight county basis the expense per county is as follows: Ross, $4,040; Fairfield, $5,040; Highland, $2,600; Pike, $944; Scioto, $4,425; Fayette, $3,280; Jackson, $1,440; Pickaway, $4,000.

At the opening of the meeting, Highland county commissioners announced that that county would come in on the plan. Fairfield county was allowed until June 7 to decide. The matter will also be taken up with Hocking, Athens, Jackson, and Vinton counties.

Former Representative Thinks the Building by Several Counties a Wise Proposition.

Editor Eagle:

I have recently noticed several items in the Daily Eagle of a movement on foot for Fairfield County to unite with several adjoining counties to build a hospital for the treatment of tuberculosis.

Certainly there never was a more humane movement started. Vast sums of money are spent each year for the prevention of the spread of cholera among hogs and for the hoof and mouth disease among cattle. How much are they better than human beings? I read just a few days ago from an apparently reliable source that there are more people die each year in this country from tuberculosis than lost their lives, both North and South during the four years of our civil war.

There is enough wealth and there ought to be enough enterprise in Fairfield county to carry this enterprise through without the assistance of another county. To be sure it would be better for adjoining counties to unite, but better go it alone than let the project fail. There are many ideal locations near Lancaster for such a hospital, where could be had quiet, good water and the advantage of a pure, dry atmosphere.

I am now a patient at Agnes Memorial Sanatorium, Denver, Colorado, for treatment of tuberculosis. Fortunately, I discovered my condition in its incipient stage and no doubt can easily be brought under control, but there are many who are not in condition financially or otherwise to go off a great distance for treatment, who could be either greatly benefited or entirely cured right at home. For the sake of humanity do not let this project die out, but push it forward to a realization.

Respectfully,

A. F. TURNER.

Denver Colo., Mt. Clair Sta.
May 26, 1915. —*Lancaster Eagle*, May 29, 1915.

The Tuberculosis Hospital Cost.

Stark county has paid more than Summit, Portage or Columbiana counties and only a little less than Mahoning county toward the expenses of the Springfield Lake Sanatorium up to date, it is shown by the report of Treasurer Henry W. Detmering of Canton, to the county commissioners. The report includes an audit of Treasurer Detmering's books by a Youngstown firm of public accountants.

The five counties have paid in up to date $288,566.78 of the total appropriation of about $320,000, leaving about $32,000 yet to be received by the institution.

Of this sum, the trustees have spent $277,550 for real estate and buildings, and $45,000 for furnishings. It will cost two and one-half times as much for the maintenance of the sanatorium for the year from March, 1915, to March, 1916, as it did the previous year, while the building was being erected. The maintenance cost this year is estimated at $30,000.—*Lisbon Patriot*, May 21, 1915.

Butler County Hospital.

The county board of visitors today asked the county commissioners to add a dining room to the proposed new hospital at a cost of $1,000, but lack of funds prevents this at this time. The board was assured that when the next liquor settlement is made it may have money for this addition. Bids for the new hospital will be received June 9, and if low enough the difference between the bid and the appropriation may permit the addition of the dining hall. — *Hamilton Journal,* May 26, 1915.

Urge County to Give Assistance.

NILES AND WARREN COMMITTEES APPEAR BEFORE COUNTY COMMISSIONERS IN INTEREST OF ANTITUBERCULOSIS WORK.

Superintendent of Schools W. C. Campbell, Dr. Gaston Frack and Mrs. E. W. Kerr, comprising a Niles committee, appeared with a similar committee of Warren before the county commissioners in the county seat at 1 o'clock this morning to present the work of the Anti-Tuberculosis Society of Trumbull county and urge that support be given it by the county authorities.

The Niles and Warren committees asked the county commissioners to relieve the society of the nurse's salary, pointing out the importance of the work, its relation to the public welfare, and the need of extending it.

All the funds of the society come either as dues of members or as voluntary contributions. It is hoped to extend the work this season, and if the county commissioners will relieve the society of the nurse's salary the organization will be able to give more and wider relief to patients, who if the disease is not too far advanced can be nursed back to health. — *Niles News,* May 24, 1915.

Health Officers Plan War on Fly.

Representatives from Xenia, Springfield, Piqua, Hamilton, Greenville and other cities, were present at a meeting in Dayton, June 2d, to listen to an address by Dr. J. H. Landis of Cincinnati on the subject of "The City's Waste and Its Disposal."

Prominent among those in attendance were Dr. L. R. Thompson and Dr. H. F. Smith, representing the division of sanitation and scientific research of the federal government; R. E. Tarbett and H. A. Craven, engineers; Dr. J. Morton Howell of Dayton; and Dr. R. H. Grube of Xenia, and others.

The lecture, delivered by Dr. Landis, who is the health officer of Cincinnati, was largely technical. He dealt with the various forms of garbage disposal and sewage disposal, outlining their general effect upon the health of the community.

In discussing the elimination of the fly, he said that the most important thing from a health standpoint in the campaign against this insect, is to annihilate the breeding places. He said that all manure piles, which are the originators of the fly, could be made practically harmless by sprinkling them with borax in the proportion of a pound to 12 bushels of the manure. This method has been found almost entirely effective wherever it has been tried, he said. The speaker declared that most of the typhoid fever, espcially that which develops late in the season, is traceable to the fly.—*Dayton News*, June 3, 1915.

AN EXPLANATION.

In the April number of the OHIO PUBLIC HEALTH JOURNAL appeared an editorial under the heading "The Enforcement of Morbidity Reports". Comment was made upon the importance of securing prompt, accurate and complete morbidity reports, and the results of such reports in directing intelligently a health department's activities. The co-operation secured by an efficient health officer in this matter was contrasted with the lack of co-operation given to a listless, indifferent health official, and the general statement made that where the latter situation obtains, the health department cannot give a proper amount of health protection for the amount of money expended. Unfortunately a paragraph was also inserted mentioning that Columbus and some of the smaller cities of the state were behind some of the Ohio villages and townships in the thoroughness with which morbidity reports are secured. The Health Department of Columbus has directed our attention to the fact that the specific mention of Columbus, in connection with other statements in the editorial, might lead to the belief that the purpose of the editorial was to criticize the efficiency of that department. It is far from the editorial policy of the OHIO PUBLIC HEALTH JOURNAL to criticize openly in its columns the various health departments of the state. We hasten to correct any misunderstanding that may exist and state emphatically that no specific criticism of the Columbus Department of Health or its health officer was intended, and we offer an apology herewith for any misunderstanding created by the editorial. Columbus is not alone in its failure to secure immediate results from the present system of securing morbidity reports, and other communities in the same class should have been mentioned or specific mention of Columbus omitted. The Columbus Department of Health has assured us that a plan to better the reporting situation has been in contemplation for some time and we feel sure that Columbus will soon assume its rightful place when ranked according to the thoroughness with which morbidity reports are collected and collated.

CURRENT COMMENT ON MATTERS OF PUBLIC HEALTH AND SANITATION.

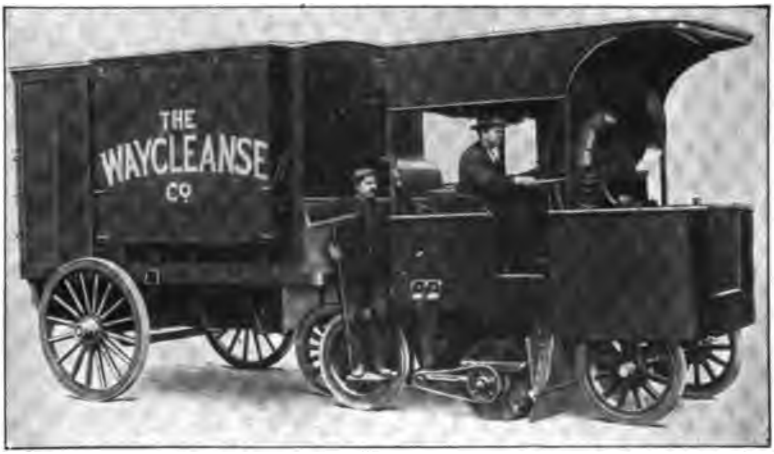
The Vacuum Cleaning of City Streets.

The crude and antiquated methods usually in vogue of cleaning city streets has received a paragraph in the Ohio State Board of Health's report on "A Survey of Industrial Health Hazards and Occupational Diseases of Ohio." (p. 291). The principle of applying vacuum cleaners to this process would appear highly feasible.

The following is taken from "Safety" for March 1915, pages 86-87:

NEW SUCTION CLEANER FOR CITY STREETS.

A machine that should prove of interest to municipal street cleaning departments, is the suction cleaner manufactured in Sandusky.



Suction street cleaner with detachable dirt box in rear.

From recent experiments conducted in Sandusky, Ohio, on asphalt block pavement thirty feet in width, the amount of dirt swept up by this machine averaged eighteen cubic yards to the mile. An expansion chamber in the dirt box contained four cubic yards of heavy material, mostly sand, which averaged in weight 2,040 pounds to the cubic yard, the dead air chamber containing about one cubic yard of dust as fine as flour.

Another test of the machine was on brick pavement in a business section consisting of six blocks, about one-half mile long and forty feet wide, two blocks being of old style pavement having a sand filler very uneven and full of holes; two blocks being of old style pavement with sand binder but in smooth condition; two blocks being of modern type with a cement filler. The first time that the machine swept this territory the average collection of dust was three-quarters of a cubic yard to the block. The pavement was swept again after two days without any attention in the interim by the "white-wing" squad. The accumulation from this same territory was one and three-quarters cubic yards from the six blocks. It was swept again after one day's accumulation and the amount picked up then was three-quarters of a cubic yard over the entire territory. After this territory was swept the third time, the pavement was entirely free from dust, and by drawing one's hand over the pavement there were no indications of dust left on the hand.

Rear door of dirt box open, showing the dirt collected. Note the layers. There are 4 yards of dirt in the box, swept from 27,280 square yards of street surface.

The larger type of sweeper shown in the first of the accompanying photographs is provided with a foot board to carry a helper. When the machine is working on very uneven pavements, the holes in the pavements that are beyond the deflection of the broom are swept out by the helper. Any heavy litter on the street is picked up by the helper and deposited in a receptacle provided on the front end of the dirt box.

The trailing dirt box can be detached at any time and a water tank attached in its place; if necessary, the broom of the sweeper can be removed and a "squeegee" attached for scrubbing the streets. This suction cleaner can be operated by gas or electric power.

Exercise and Health.

In "Exercise and Health," an educational leaflet from the United States Public Health Service, a note of warning is sounded. The death rate after the age of forty is increasing in spite of more sanitary modes of living and greater protection against communicable disease. The expectation of life after forty is less than it was thirty years ago. This is due largely to increased prevalence of the diseases of degeneration. The muscles, arteries and other organs of those who as a result of sedentary occupation or indolence take too little exercise degenerate. Heart disease, kidney diseases and other ills follow.

Take exercise. Take daily exercise. Have a hobby that gets you out of doors. Walk to your business, to your dressmaker's, walk for the sake of walking. Join a walking club and keep your weekly score of miles. Keep chickens, make a garden, wheel the baby or play golf or any other game, but take two hours outdoor exercise every day. Gymnasium work is good for those who like it and can afford it, but avoid heavy athletics. Don't try to be a "strong man", the champion athlete often dies young. Be a moderate, persistent, daily exponent of exercise. You may not burn the family carriage, as Benjamin Franklin suggested, but at least as he advised, walk, walk, walk.

Borax a Fly Preventive.

Each spring when the anti-fly campaigns start up, the State Board of Health is repeatedly called on to recommend some chemical treatment that will destroy fly larvae in manure. To find that chemical which will destroy the fly economically and at the same time preserve the fertilizing value of the manure appears to be a somewhat baffling question to scientists but one they are hopeful of solving. In fact through a long process of experimentation with different chemicals, the United States Department of Agriculture believes that it has found what may be relied on as an economical, practical and fairly effective larvicide. It is ordinary borax.

The Bulletin of the United States Department of Agriculture speaking of the favorable results obtained by the use of borax says: "It possesses a marked larvicidal action and appears to exert no permanent injury on the fertilizing value of the manure."

The Bulletin reckons the cost of borax treatment, using ordinary commercial borax costing 5 to 6 cents per pound, to be one cent per horse per day, and recommends about a pound of borax to every 15 cubic feet or 12 bushels of manure immediately after its removal from the stable, or in other words, about a pound per horse per week. It further advises the sprinkling of the borax through any fine sieve over the manure especially around the outer edges if placed in a pile and that the whole be sprinkled with 3 to 5 gallons of water.

While the State Board of Health would not for a moment frown on the use of borax where borax is necessary, or where for some reason prompt removal of manure seems out of the question, attention should be called to the danger of trying to use some larvicide to the neglect of ordinary cleanliness. In other words, beware of perfume where a bath is needed.

Where practical, manure should be placed in a tight, tongued and grooved box so that the larvæ cannot work their way down or out through cracks and so that female flies cannot deposit more eggs in the manure. Such a box should be cleaned out thoroughly not less than once every five days, or better still twice a week.

Keep the Babies Well.

FLIES AND HEAT INCREASE BABY DEATH RATE THIS SEASON.

During the months of May and June the baby death rate begins to climb, reaching its height in July and August. It should not be forgotten that this is the season when babies should be given the greatest care and attention in order to keep them well. There are two causes demanding this: heat and flies. Heat is depressing. It increases every danger that baby is disposed to. If there is lack of cleanliness about baby or baby's things, heat increases it and makes it harder to bear; if baby lives in foul and stuffy air, heat makes it sickening and unendurable; if its food is not handled with greatest cleanliness and care, heat makes greater its infection and therefore increases its danger to baby's health and life.

Then there are flies. Flies are baby's greatest enemy. They should never be allowed to come in contact with baby itself, or its food, or any of its playthings. They carry numerous diseases but are the main carriers of diarrhoeal diseases, commonly known as "baby summer complaint."

The baby death rate from this disease climbs especially high during these months. And strange as it may seem to some mothers this is a preventable disease. It is mainly a fly-borne disease, though it may sometimes be carried in impure water and milk. The mother therefore would be safe in giving her child only pasteurized milk and an abundance of cooled boiled water, and in keeping it from flies and fly infected food. To keep the baby well will be worth all the pains and more.

The Campaign Against Cancer in New England.

The New England states generally show a higher death rate from cancer than any other group of states. This does not mean that New England people are more susceptible to this disease. Cancer is a disease of later adult life and it is well known that in parts of New England there are more old people proportionately to the population than in many other regions. Nevertheless, the death rates recently published by the U. S. Census Bureau have stimulated much activity in these states in the educational campaign for the control of malignant disease.

What are the facts upon which this movement is based? According to the report of the Census Bureau, in 1913 there were 49,928 deaths from cancer in the registration area of the United States, corresponding to a death rate of 78.9 per 100,000 of the population.

All the New England states have individual cancer death rates much higher than this. Connecticut's rate, which was the lowest of any of the New England states, was 85.1. Vermont's rate was the highest with 111.7, while the rates of the other states were correspondingly high, Maine having a rate of 107.5, New Hampshire 104.4, Massachusetts 101.4 and Rhode Island 93.3. When these figures are compared with those of Kentucky, with a rate of 48, they seem indeed very high. They mean that 6,817 people died in 1913 in New England from cancer. But it does not necessarily follow that cancer is more common in New England than elsewhere.

The Census Bureau attributes the high cancer death rates in certain districts to the relatively high age distribution of the population and the negligible amount of immigration. Translated into every-day terms this means that in New England the proportion of people over forty years of age, or at the cancer age, to those under forty, and so less liable to cancer, is greater than in other places. Yet there is no doubt that cancer death rate in New England as well as in other parts of the country is much higher than it ought to be. Without question a large percentage of cancer deaths can be prevented by early recognition of the symptoms and prompt recourse to competent surgical advice and treatment. Cancer is not a hopeless incurable affection, as so many people wrongly believe. Those who know the facts believe that if the public can be properly educated in regard to the early signs of the disease and will act on this knowledge, the present mortality should be reduced at least half and perhaps two-thirds.

That New England is awake to this opportunity of saving lives is evident from the activity in several states. To protest against taxation without representation the patriots of Massachusetts dumped overboard the famous cargo of tea. Vermont medical men have become so concerned over the high cancer death rate of their state that they are going to hold a "tea-party" of another sort and attempt to dump overboard the high death rate from malignant disease. While their action is not so dramatic as that of the patriot raiders they hope to prove that through its great ultimate benefit to the community it will be almost as patriotic. The New Hampshire State Board of Health has recently published sound advice in its Bulletin. In Maine an active committee of the State Medical Society is arranging public lectures and causing the publication of instructive articles in the newspapers. Massachusetts has a well-organized branch of the American Society for the Control of Cancer with headquarters in Boston. The Vermont State Medical Society has arranged a series of public meetings to spread the bad news of the high cancer death rate and the good news of the hope of controlling the disease by earlier recognition and prompt surgical treatment. Morning, afternoon and evening meetings will be held on Tuesday, Wednesday, Thursday and Friday, June 8th to 11th, at Rutland, Burlington, Montpelier and St. Johnsbury. The Vermont State Board of Health will send its secretary, Dr. Charles F. Dalton, to address each of these meetings and the American Society for the Control of Cancer will be represented by Dr. Francis Carter Wood, Director of Cancer Reseach at Columbia Univesity, New York City, and by Dr. J. M. Wainwright, Chairman of the Cancer Committee of the Pennsylvania State Medical Society.

Responsibility of Diseased Teeth for Impaired Health.

Few other forms of disease have made such appalling and extensive onslaughts on the health conditions of the human race as has this inexcusable, unclean condition of neglected teeth. When one realizes that diseased teeth lead to indigestion, to heart, throat and ear complications, and that sometimes they promote acute infectious disease, it is seen that they are responsible for much of the ill health of the human race.

To overcome this state of affairs the child should be taught from its earliest understanding the great importance of this matter. He should not merely be told to keep his teeth clean but it should be seen that he brushes them regularly and that he uses as a mouth wash some harmless antiseptic.

Who could be well and happy with teeth diseased, with dental cavities collecting food, with putrid bacterial growth working its way along to the stomach and through the alimentary canal? Some alveolar abscess which causes intense agony may also cause pus to be absorbed directly into the blood or taken into the stomach and intestines.

Both children and grown-ups should have their teeth inspected and, if necessary, treated by a reliable dentist at least every six months, if they wish to preserve their teeth and good health.—Abs. *American Journal of Nursing*, 1915.

Pyorrhea or Riggs' Disease Now Easily Curable.

Nearly everybody has Riggs' disease. Dentists tell us that at least 95 adults out of 100 have it to a more or less extent. This disease has baffled dentists for years. The loss of about half the permanent teeth is said to be due to this obstinate chronic disease. Now it is claimed to be curable. Thanks to science!

Riggs' disease, or pyorrhea as the dentists call it, is a chronic disease of the gums, or rather the membrane that surrounds the roots of the teeth and lines the sockets of the gums. It causes the gums to gradually recede from the teeth, exposing the more delicate neck of the tooth and giving the teeth an elongated appearance. This process continues and in the course of years causes the gums to bleed easily and to become sore and ulcerous. It finally causes the teeth to become loose and almost drop out.

Now it has been found that all this trouble is due to a peculiar germ that destroys this membrane which surrounds the root of the tooth and which lines the socket in which it rests. This particular germ is readily destroyed in from 3 to 6 days' treatment.

To begin the treatment one should consult a dentist and have the teeth thoroughly cleaned. Deposits of tartar or yellow calcareous matter which accumulates, particularly along the inner edges of the teeth and between the teeth should be removed as these deposits irritate the gums and furnish lodging places for many kinds of germs. After the teeth are cleaned, or even before cleaning, one should begin the use of some form of the drug ipecac. This is conveniently taken in tablet form under the drug name of alcresta ipecac. Directions for taking the ipecac usually accompany the drug or any dentist can furnish the information. Emetine, a similar drug, is sometimes used with equally good results.

To prevent reinfection, which is very easy, particularly with the use of common drinking cups, it is recommended that in washing the mouth and teeth a drop of a solution of one part fluid extract of ipecac to ten parts of alcohol be used on the wet tooth brush. The use of one drop of this alcoholic solution as a mouth wash on a wet tooth brush should be continued regularly at least twice a day to prevent reinfection.

Inspection of Government Buildings Brings Sanitary Reforms.

UNITED STATES PUBLIC HEALTH SERVICE REPORTS ON HEALTH CONDITIONS.

The U. S. Public Health Service has completed its monthly sanitary inspection of Departmental buildings within the District of Columbia. This work, instituted by Executive order three years ago, has been of marked and far-reaching benefit, resulting in the correction of evils and the remedying of conditions detrimental to the health of workers, as well as improvement in the standards of cleanliness and order of the buildings inspected. The necessity for investigations of this character was realized long before they were made effective. That the many thousands of clerks, mechanics, laborers, and scientific workers employed in the buildings under control of the Government, should be adequately protected from debilitating influences, unwholesome surroundings, or the contraction of disease, goes without saying. That this protection should result in a decided monetary saving to the Government is also apparent, for whatever reduces the number of days absence on account of sickness, or increases the efficiency of workers, is a financial gain. Considering these facts, the U. S. Public Health Service has from the beginning regarded the work of importance and has endeavored to conduct, not alone a mere formal inspection, resulting perhaps only in criticism of existing conditions, but rather one which would bring about improvement wherever objectionable features were discovered, and result in benefit both to employer and employees. For this reason the Service has detailed officers to the work who have had ample training and practical experience along the lines of industrial hygiene and these men have advanced suggestions looking to the welfare of all concerned.

MANY REFORMS MADE.

What has been accomplished in this direction? Three years ago a manufacturing division of the Government was rated as highly dangerous to the health of employees on account of the dust produced. Today that same establishment is absolutely free from dust and without menace to health. When the inspection service was inaugurated many of the workrooms and offices were overcrowded, even in the better class of buildings, the floor space and cubic air space per person in certain instances being less than half the normal requirements. The evils arising from such congestion were striking. The lowered resistance of the workers, the rapid dissemination of the common colds and infections, and the breathing of a vitiated atmosphere, were all direct effects. At the present time there is not a Government employee whose allotment is below the minimum requirement. The ventilation of offices has also been strikingly improved. Structural changes have been made in numerous buildings and additional windows, skylights, and ventilators have been installed. The congestion of rooms with specimen cases, filing cabinets and unnecessary articles which interfere with the free circulation of air has been controlled, and that most useless appurtenance, the office screen, almost entirely eliminated. The lighting has been improved. The relation between improper illumination and eye strain and its effects has been carefully considered, and wherever deficient lighting has been observed, immediate steps toward its correction have been taken. The artificial illumination has been correspondingly improved, and the aim has been to afford every worker a well shaded, properly adjusted light, altogether free from glare. Not only this, but the Service is now engaged in making exact photometric measurements in many of the bureaus and the refracting of representative groups of employees, to determine the effects of improper illumination.

HOUSE CLEANING GOVERNMENT BUILDINGS.

There is not a single Government building in which the standard of cleanliness is not higher than three years ago. This does not mean that all have attained perfection, but it does indicate that they are on their way toward this goal. Disorder and confusion have been superseded by methodical arrangement. The stacking of material on floors and in corners, the littering of desks, and the improper disposition of clothing and sundry articles, have all been diminished, in some instances strikingly so. There is a better appreciation of the fact that disorder breeds dirt. Inspection of lockers and desks by custodians has become customary, and it is no longer regarded as interference with the rights and liberties of the users. The work done along this line is only a beginning and it will continue until a higher and higher standard is maintained.

GREATER ATTENTION TO COMFORT OF WORKERS.

The comfort and welfare of the workers have also not been forgotten, and the common weal has been considered rather than the well being of particular individuals. A greater number of electric fans are now used during the heated season, locker accommodations have been increased in nearly every building, rest periods advocated where the employment is tiresome or monotonous, and temperature and humidity more carefully regulated. The common drinking glass has been prohibited, and in many cases bubblers or sanitary fountains substituted, while insanitary water coolers have been replaced by those of a more approved pattern.

HEARTY CO-OPERATION BY CUSTODIANS.

The suggestions advanced in the majority of instances have been cordially received, and even when criticism was offered but few of the custodians have indicated any resentment. Much has been found that was praiseworthy and wherever this has been the case approval has been recorded. A number of custodians of buildings in the District are most competent officials, and some have even become experts in the administration and care of large establishments, and their services are of great value. Such men are ever keen to learn of newer and better methods of care and improved arrangements for accomplishing the tasks before them. The annual inspection to them is an opportunity for the exchange of ideas and the time is invariably well spent.

Naturally not all of the recommendations advanced by the sanitary inspectors can be carried into effect, owing to limitation of funds, the undesirability of altering rented buildings, or for other reasons. However, their reports serve to make every objectionable feature a matter of record, and it is believed that the majority of insanitary conditions referred to have received attention. The condition of the respective offices will bear out this statement, and the testimony of clerks further indicates that marked changes toward betterment have been observed. It is considered that the necessity for work of this character is probably even greater in Government buildings outside of the District of Columbia than with those within, and an extension of this most desirable inspection service is expected.

Why Is Bad Air?

Air is bad, when it is overheated, when it contains an excess of moisture, and when it is chemically contaminated. This is the conclusion of the New York State Commission on Ventilation, as summarized by Professor C. E. A. Winslow, Chairman, in the official organ of The National Association for the Study and Prevention of Tuberculosis, the Journal of the Outdoor Life.

Professor Winslow shows that while it has been a matter of common belief for a long time that stagnant air was bad for the body, until recently no one knew why this was so. The New York State Commission on Ventilation has definitely proven two counts against bad air, one of them for the first time in history, and will probably prove others later on.

The first indictment against bad air shows that an increase in temperature beyond the normal seventy degrees produces serious derangement of the vaso-motor mechanism of the body, resulting in a rise of temperature, increased pulse, and a lowered blood pressure, with a corresponding decrease in efficiency, both physical and mental. In addition to this, overheating conduces to an undesirable congestion of the mucous membranes of the nose, thus, possibly paving the way for colds, sore throats, and attacks of various germ diseases.

The work of the Commission also proves that chemical accumulations in the air as a result of air stagnation, bring about a decreased appetite for food, which in turn must have an unfavorable effect on the entire body. In the Commission's experiments, the people living in fresh air ate 4½ to 13 per cent more than those living in stagnant air.

"These experiments," says Professor Winslow, "indicate that fresh air is needed at all times and in all places. While we have changed our ideas as to what causes bad air, ventilation is just as essential to remove the heat produced by human bodies as it was once thought to be to remove the carbon dioxide produced by human lungs, and it is now proved also to be essential for carrying away chemical products which exert a measurable effect upon the appetite for food. People who live and work in overheated and unventilated rooms are reducing their vitality and rendering themselves an easy prey to all sorts of diseases, such as tuberculosis, pneumonia, grippe, etc."

Compensation for Occupational Diseases.*

MASSACHUSETTS WORKMEN'S COMPENSATION LAW CONSTRUED TO APPLY TO ACUTE OR CHRONIC OCCUPATIONAL DISEASES AS WELL AS TO INDUSTRIAL ACCIDENTS.

Below appears an opinion written by Chief Justice Rugg, of the Supreme Judicial Court of Massachusetts, construing the workmen's compensation law of that State. This act provides for compensation for "personal injuries arising out of and in the course of" the workman's employment.

A cook employed on a lighter was suffering from valvular disease of the heart. The disease was aggravated by his exertions in saving his personal effects when the lighter sank, and he died soon after. The industrial accident board found that the death of the employe arose out of and in the course of his employment, and the court held that this finding was warranted by the evidence.

In an opinion which was published in the Public Health Reports, June 12, 1914 (p. 1583), the same court decided that blindness resulting from an acute attack of optic neuritis induced by poisonous gases with which the workman came in contact in his work was a "personal injury" within the meaning of the law and that the afflicted workman was entitled to compensation.

Later the court held that lead poisoning was included within the terms of the act. (Johnson v. London Guarantee and Accident Co., Public Health Reports, July 3, 1914, p. 1781.) In the opinion Justice Crosby said: "It is clear that 'personal injury' under our act includes any injury or disease which arises out of and in the course of the employment which causes incapacity for work and thereby impairs the ability of the employee for earning wages."

The decisions above referred to construe the Massachusetts workmen's compensation law as providing for compensation for workmen acquiring acute or chronic diseases as a result of occupation, or in the course of employment as well as for workmen injured by industrial accidents.

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* Public Health Reports, 1915.

MASSACHUSETTS SUPREME JUDICIAL COURT.

INDUSTRIAL DISEASES — COMPENSATION FOR, UNDER WORKMEN'S COMPENSATION ACT.

In re Brightman. In re Aetna Life Insurance Co.
107 N. E. Rep., 527. Dec. 31, 1914.

RUGG, C. J.: * * *

"The deceased employee was a cook upon a lighter, where his employment required him to live and be a large part of the time. The craft began to sink and he then made several trips to and from the deck in an attempt to save some of his clothes and a surveying instrument. With these he hastened to the dock, where he died soon after. He had suffered from valvular disease of the heart, and his exertions in the effort to save his belongings and the excitement incident to the loss of the vessel so aggravated the heart weakness as to cause his death. The perils of the sea were risks arising out of and in the course of the employment of the deceased. The sinking of the boat obviously was one of these perils. It is impossible to say as matter of law that it is not one of the instincts of our common humanity to try to save from a sinking vessel all of one's possessions that reasonably can be secured. The deceased perhaps exerted himself too much for this purpose, although it would be difficult on the evidence to determine to how great an extent the fatal result was due to that cause rather than to the excitement of the occasion. Under these circumstances the calm and wisdom of quiet and safety can not be expected. Much must be excused to the surrounding commotion. The deceased did not abandon the service of his employer and embark on a venture of his own when he tried to save his clothing. It was an implied term of such service as this that the employee might use reasonable effort to this end in an exigency like that which arose. This is not an instance where the discipline of a ship was violated or a higher duty neglected. It was in the course of his employment to live upon the lighter. Whatever it was reasonable for anyone to do leaving a sinking vessel, which was his temporary home, was within the scope of his employment. The standard to be applied is not that which now, in the light of all that has happened, is seen to have been directly within the line of labor helpful to the master, but that which the ordinary man required to act in such an emergency might do while actuated with a purpose to do his duty.

The cases relied upon by the insurer, collected in 25 H. L. R. 420, 421, are distinguishable. They all are instances of conduct by the employee quite outside the scope of the employment, resting upon intelligent abandonment for the moment of duty to the employer. In the case at bar there may be found to be apparent to the rational mind a causal connection between the employment and the thing done by the employee at the time of the sinking of the lighter. McNichol's Case, 215 Mass. 497, 102 N. E., 697.

Acceleration of previously existing heart disease to a mortal end sooner than otherwise it would have come is an injury within the meaning of the Workmen's Compensation Act. Wiemert v. Boston Elev. Ry., 216 Mass., 598, 104 N. E., 360; Clover Clayton & Co. (Ltd.) v. Hughes (1910), A. C. 242. The inference that the death of the employee arose out of and in the course of his employment was warranted by the evidence."

Address to be Delivered Over the Body of a Young Man Dead of Typhoid Fever.

We have met today for the sad purpose of performing the last solemn rites over the body of one who has passed into the Great Beyond. Our hearts are overflowing with grief at the untimely ending of this life so full of promise. He had just begun his career. Still in the time of sowing, he had not reached the point where he could see the grain begin to grow, much less had he reached the time of harvest. In thinking about this matter, many may be led to wonder why it has pleased the Divine Creator to remove this promising young person from our midst, to cut short a life so well begun. They bow their heads and say "Thy will be done" but without understanding the logic of it all. If they will but consider for a moment they will realize that the reason they do not understand it is because they have not themselves been logical. They assume that the responsibility for the death of this young man, and the grief, sorrow and loss which it entails, lies with the Creator, whereas the immediate responsibility in every case of typhoid fever rests upon man himself. God, in His wisdom, has placed mankind in possession of the knowledge of the causative agent and the means of its spread. He had opened up our minds that we may understand how this disease may be prevented and avoided, and He has given us an almost infallible weapon with which to protect ourselves from the attacks of the germ which causes the disease. Therefore, this bereavement means that some one has failed to make use of these God-given means of protecting human life. Many a time, as in the present instance, it is the innocent bystander who suffers from the neglect of another: from somebody's failure to realize that he is his brother's keeper. It is impossible in the present instance to exactly fix the responsibility for the sickness and death of the departed, but some man or woman is responsible because only human beings have typhoid fever, and the disease cannot be acquired excepting from some person who has the disease or who is harboring the germs which cause it. Like every other person who contracts this disease, this young man unwittingly took into his body something which came from the body of another person. Possibly he may have received it directly or indirectly from some person who suffered from a very light attack of typhoid fever, and who by the carelessness of his habits subsequent to his recovery was the means, possibly the innocent means, of the spread of the disease to other people. It may be that some one who was wantonly careless in the manner in which he disposed of the waste products of his body brought this grief upon the family of the deceased, and this economic loss to our community. Perhaps the responsibility in the present instance does not lie with any one individual, but with some town or city which has been careless in the method of ridding itself of its offscourings, or has been indifferent to the laws of sanitation in securing its drinking water.

At any rate, the death of this young man could have been prevented! It was entirely unnecessary. It is the price which we are made to pay for somebody's ignorance and carelessness. The day is fast approaching when such sacrifices shall cease to be. It will arrive only when we have learned that the presence of typhoid in a community means that some one has been criminally negligent of his duty. Today, with hearts bowed down by the grief of our loss, let us resolve that we will henceforth so order our lives that we may conduct them without menace to others. Let us take unto ourselves the lesson of this hour, and in our own sorrow fix our determination to prevent the coming of sorrow to others. If we do this, this dead shall not have died in vain. —*Assistant Surgeon General W. C. Rucker, United States Public Health Service, Washington, D. C.*

A Time Saver.

HOW ANTI-TYPHOID VACCINE SAVES TIME FROM SICK LEAVE IN THE ARMY.

Typhoid fever used to be a time-killer. Now the efficiency experts have knocked it clear out of the box. In the army, navy and elsewhere, where men are off duty or laid up in a hospital at the employers' expense, careful records of the loss of time on account of various causes were kept.

For six years prior to the introduction of anti-typhoid vaccine in the army in 1910, our soldiers lost time on account of sickness from typhoid at the rate of over 71 days every day for an army of 100,000. In 1910, when anti-typhoid vaccination was offered the soldiers if they cared to take it, enough of them took it to reduce this daily loss of time or sick leave in the army from 71 to 49. In March, 1911, anti-typhoid vaccination became compulsory and for that year the rate was still further reduced from 49 to 20. In 1912, with vaccination compulsory, the sick leave from typhoid dropped to 8 days per 100,000 soldiers and in 1913 to one-third of a day. In other words, by applying the efficiency idea, the time loss in our army from typhoid was reduced from 71 days to one-third of a day.

Deaths from the Sequelae of Typhoid Fever.

While we know the number of deaths from typhoid fever and have estimates of the number of persons incapacitated and the resultant economic loss to the community, we have little definite information as to the number of deaths that are due to the sequelae of typhoid fever. Recently, Dublin has reported the results of a study of 1,574 cases of typhoid fever which occurred during 1911, and whose histories are recorded in the files of the visiting nurse service of the Metropolitan Life Insurance Company. 146 of the patients died, a death rate of 9.28 per hundred. To determine the effects of the disease on vitality for the three years following the attack, the actual mortality of the 1,428 survivors was compared with the expectant mortality among the same class of persons. It was found that among the 1,428 survivors the expected number of deaths was 26.45, while the actual number was 54, giving a mortality of twice the normal during the first three years following the attack. The increased rate was greatest during the first year following recovery.

Among the causes of death tuberculosis heads the list, with diseases of the heart following. Dublin believes that in the United States each year 8,000 deaths occur among persons who have recovered from an attack of typhoid fever, because of their impaired vitality. This study is an important one and similar studies should be made of the after effects of other diseases, such as measles and whooping cough. — Abs. *Jour. Amer. Med. Ass'n.*, 1915.

Diet and the Intestinal Bacteria.

It has long been the conviction of those who study the processes which go on in the alimentary tract that diet influences noticeably the intestinal flora. While this fact has long been known in a general way it remained for Herter and Kendall to determine precisely, by modern methods, the effects of definite and abrupt variations in the chemical composition of the food upon the intestinal bacteria. These observers studied the fecal bacteria which are found under extreme dietary conditions. It was found that rapid changes from a dominantly protein dietary to one consisting of milk and sugar, produced a pronounced change in the nature of the flora as well as in the putrefactive products of the feces and urine. Under the former dietary acidophilic, non-proteolyzing types were present and these changed rapidly to a strongly proteolyzing type when the latter dietary was adopted. There is also a simplification of the intestinal flora, and a reduction in the organisms of the colon type accompanying the other changes. J. C. Torrey endeavored to study the effects of different dietary upon the intestinal flora of human beings. He used as his subjects patients with typhoid fever who had been placed on the "high calory" diet. His examination of the stools early in the course of the disease indicated that the intestinal flora in such patients is not uniform or specific in types but exhibits the variations that may be observed in a group of supposedly normal individuals. The character of the intestinal flora is evidently not a factor concerned in the determination of susceptibility to typhoidal infection. Torrey found that with this high-calory diet the intestinal flora tended to become simplified and there was a decided tendency for the development of a fermentative type, with Bacillus acidophilus as the dominant organism. A more liberal carbohydrate regimen brought about a greater transformation of the flora than did milk alone. Patients with an acidophilic or fermentative type adapted themselves more readily to the high-calory diet, enjoyed comparative freedom from the distention accompanying the putrefactive type of flora and showed a tendency to run a mild course. Investigations such as these are of value in pointing out the most favorable dietaries for certain conditions.—Abs. from *Jour. Amer. Med. Assoc.*, 1915.

Women in Medicine.

In 1865 Elizabeth Garret was refused admission to the medical schools of England. In 1874, the London School of Medicine was founded and included on its staff, both men and women. As late as 1877, the British Medical Association declared women to be ineligible to membership. As forty years ago the London School of Medicine was a pioneer in promoting the welfare of women, so today it is to be found in the foreranks of institutions interested in medical education.

The opportunity for women in medicine is rapidly increasing. The broad social interests in life with which medicine is interwoven has called forth the enthusiasm and spirit of women in no uncertain way. The traditional opposition against women in medicine has by no means died out. The best antidote for this narrowmindedness is to be found in the practical results achieved by women in this field.

The sympathy, tact, and understanding of women coupled with good general education and special training have made them effective workers in the field of preventive medicine. The institutions of popular lecture courses under the auspices of the women physicians of the American Medical Association represents a distinct field of service to the community which reflects honor and distinction upon the entire profession.

There has been a marked increase of women physicians in the last forty years. While the total number of women in all occupations increased 300 per cent; the number of women physicans and surgeons increased by over 500 per cent. During the same period of time, while the total number of men in all occupations was increased 250 per cent, the increase of male physicians and surgeons was only 75 per cent. Herein is a strong indication of the growth in power and value of women in medicine. They represent a group not alone to be reckoned with, but to be encouraged. Their services are necessary for the development of preventive medicine. Their voices and hands must be constantly employed in aiding the public movements for the benefit of society.

Among the first women to be economically emancipated were the pioneers who sought their intellectual salvation in the medical profession. There are still reactionaries who deprecate the education of women in medicine. Their short-sighted vision scarcely requires consideration in view of the fact that women are established in medicine not by reason of their actual increase in numbers, but because of their activities and accomplishments.—Abs. *Medical Review of Reviews*, 1915.

The Control of Venereal Diseases by Health Departments.

With the one exception of the Health Department of the City of New York the health departments of our cities have left practically untouched two of the most common and dangerous communicable diseases. Dr. Baker of the Worcester Health Department believes that the time has come when every state and municipal health department should spend some part of its appropriation in attempting the control of syphilis and gonorrhea. The long neglect of these diseases is a shame upon the medical profession, the church and the schools, for the problem is moral and educational as well as medical. The ravages of venereal diseases are so fearful and far-reaching that the task of control seems almost hopeless, but the problem must be faced.

It is difficult to arrive at a correct statistical estimate of the situation. Very few of the deaths from these diseases are even properly recorded. To the actually recorded deaths from syphilis should be added practically all the deaths from paresis, locomotor ataxia, other cord diseases, many coarse brain lesions, a large proportion of apoplexies, heart diseases and nephritis. If the real cause of death were given syphilis would rank within the first six great diseases that destroy human life. The mortality statistics of gonorrhea are equally inaccurate, and the actual mortality is perhaps not the worst feature of this disease. The number of lives wholly or partially wrecked by these infections is beyond all calculation. There are, however, some accurate statistics of morbidity. In 1912 among 78,000 men in the United States Army, there were 2,224 cases of syphilis, 6,208 cases of gonorrhea and 2,207 cases of chancroid. In that year there were more discharges on account of disability from venereal diseases than from any other one cause. In the Navy among 41,000 men there were in 1911, 9,252 cases of these diseases. From ten to twenty per cent of all persons admitted to asylums for the insane and epileptics are syphilitics. Ten per cent of all blindness and twenty-five per cent of blindness in children is the result of gonorrhea. In a recent inquiry concerning 8,000 male patients over eighteen years of age admitted for all causes to a Boston hospital, thirty-five per cent admitted having had gonorrhea and eleven per cent syphilis, at some time in their lives. There is no doubt but that one-half of the male population of civilized countries has had or now has gonorrhea and one-tenth has had either acquired or congenital syphilis. More has been learned about syphilis in the ten years since the discovery of the germ of the disease in 1905 by Schaudims, than in all previous centuries. Following this discovery came the fixation blood test of Wassermann and then Ehrlich's Salvarsan. Even yet, however, only a small percentage of cases are really cured, for the disease attacks every organ of the body, the brain, cord and nerves.

Dr. Baker recommends that these diseases be made reportable, that a state Wassermann laboratory be established and that a law be passed compelling public institutions to treat venereal diseases.—Abst. *American Journal of Public Health*, 1915.

Tuberculosis in Michigan.

"The Michigan Legislature is to be congratulated on passing the Murtha bill providing for an appropriation of $100,000 to be used by the State Board of Health in fighting tuberculosis" declared Governor Ferris, on learning that the House of Representatives had passed the bill without a dissenting vote.

"More than that", continued the governor, "it is one of the greatest pieces of legislation tending toward public health that has ever been passed by a Michigan Legislature. The various Senate and House Committees are to be congratulated on the manner they handled the bill and reported it out without amendment. As soon as the bill was introduced I could not help thinking it would pass, and when it reaches my desk I will lose no time in affixing my signature."—*Calumet, Mich., News, May* 1, 1915.

So-Called Cures for Tuberculosis are Worthless.

After investigating under the Food and Drugs Act a large number of preparations advertised as consumption cures, the Department of Agriculture has not been able to discover any that can in any sense be regarded as "cures" for tuberculosis. Some contain drugs that may at times afford some temporary relief from the distressing symptoms of the disease, but this is all. Since the passage of federal legislation prohibiting the shipment in interstate commerce of medicinal preparations for which false and fraudulent claims are made, there has been a marked tendency to label these preparations "remedies" instead of "cures" or "infallible cures," as they used to be called. In many cases, however, they can not even be regarded as remedies.

Human Conservation.

Hitherto it has been the custom to consider the value of any article in the terms of dollars and cents. When human life in the mass came into conflict with financial interest, too often humanity went down to overwhelming defeat. But we who are living now have witnessed the dawn of a new era, and we have discovered that human life has a definite value. It follows that the premature death of any individual constitutes a direct loss to the community.

Prof. Irving Fisher found that the United States suffered the loss of 600,000 preventable deaths annually. The same author has said that of those lying on sick beds, at least one-half do so unnecessarily. It has been said, and this follows naturally, if each human life has a definite value, that the loss to the country from typhoid fever alone amounts to $100,000,000 annually.

Over 35,000 fatal industrial accidents occur every year in the United States. Individuals who are crippled for life but whose accident does not end fatally number into the thousands each year.

The fault here is with the state, which has inadequate laws, the employer who does not adopt "safety first" as his motto, and the employee who does not utilize to the fullest extent the safe-guards furnished him.

Diseases due to occupation also take a heavy toll of human life every year. Heat and cold, undue fatigue, dust, dirt, dampness and darkness are the enemies of the workers in many industries. More obvious causes of industrial disease are the mineral poisons, such as lead and arsenic. The hours of labor and the minimum wage are two influences which only recently have received the attention they deserve, as contributing to the health or disease of workers.

The discovery made long ago that the individual was dependent upon the communal health, was the means of inaugurating health departments, which are now in many places centers of specialized endeavor. These departments and the general health campaign have been instrumental in prolonging life expectancy, and in some instances almost doubling it. But little progress has been made against the chronic degenerative diseases which attack the middle ages. Many of the diseases and conditions which increase mortality and decrease life expectancy are those to which people expose themselves of their own volition, such as the venereal diseases. Education in all matters relating to health is the need of the hour. The other great need is periodic physical examinations, so that disease may be detected in its incipiency and precautions taken before, not after the case is hopeless. If all persons availed themselves of periodic physical examinations and a general propaganda of education were undertaken, the work of human conservation would be greatly increased and life expectancy prolonged almost beyond our fondest expectations.—Abst. *Medical Record,* 1915.

Can Insurance Experience Be Applied to Lengthen Life?

In 1909 forty-three leading life insurance companies united in a statistical study of the records on about 2,000,000 lives with the object of determining the types of lives among which the companies had a higher mortality than the average. This study is now nearing completion. It is absolutely impartial as it was undertaken not in the interest of any propaganda but purely for business reasons. In this investigation the insured were divided into the following groups: Those in occupations involving hazards, those with a family history of tuberculosis, those with a defect in their personal history, those whose physical condition was not normal, those whose habits with regard to intoxicants were not satisfactory, those distinctly over-weight or under-weight.

Among railroad men the mortality was high. Locomotive engineers suffered a mortality sixty per cent in excess of that among the insured as a whole. The mortality among mine workers was more than double that among other insured lives, and the extra mortality among those engaged in the liquor business was seventy per cent. There is no question but that the excess mortality in these industries could be largely prevented by proper care on the part of employers and among the men themselves.

Among the insured who admitted having had syphilis prior to the date of application the extra mortality was eighty percent. Similar European studies show practically the same excess mortality among former syphilitics. Among men who had in the past used intoxicants occasionally to excess the extra mortality was fifty per cent, even though in the figures in regard to alcoholism all persons engaged in the liquor business or any other hazardous occupation were excluded. Sufficient statistics have been published by individual companies to show that total abstainers during the working years of life have a mortality only about half that among those who use alcohol to the extent of at least two glasses of whiskey a day.

The deaths from tuberculosis among those who had had pleurisy within five years prior to insurance was three times that of the average. These statistics do not show definitely whether or not a predisposition to tuberculosis is hereditary. Among light weight men, however, with a family history of tuberculosis, five out of ten deaths were from tuberculosis, while among heavy weight men with a similar family history only one death in ten was from this disease. The mortality among the insured who were distinctly over weight was about forty per cent greater than the average.

This investigation in general shows that correct living and proper living conditions will add many years to the average life and the figures are given to the public in the hope that they may be of direct benefit in reducing the death rate.—Abst. *The Public Health Journal*, Toronto, 1915.

Science and the Public Health.

Science, within the past century, has completely transformed the attitude of the civilized world toward public health problems. In the fourteenth century, the Black Death was attributed to the poisoning of wells by the Jews, and thousands of these peaceable and industrious people were burned at the stake by the superstition-crazed mobs. In 1914 the same disease, now known as the bubonic plague, appeared in New Orleans. Instead of killing Jews, systematic war was waged on rats. The Black Death destroyed twenty-five million human lives in three years, but there has been practically no spread of the New Orleans epidemic. As late as 1761, fifty per cent of the English population died before reaching the age of twenty. At present one-half of the people of England reach the age of fifty-four. Smallpox caused thirteen per cent of all deaths in Sweden in 1751-60. The death rates from the distinctly infectious diseases and the death rates among children and young people have been marvelously reduced. This vast saving in human life is due in part to the brilliant discoveries in medicine and bacteriology, but other sciences deserve their share of the credit. Statistics furnish a means of measuring progress and a guide to health work. The great advances in medicine and bacteriology would have been impossible without the assistance of chemistry and physics. The discoveries of oxygen, the anaesthetics and the various coal tar derivatives are among the many contributions of the chemist. Physiological chemistry has determined the effect of drugs on the human organism. Chemistry has made possible pure water and food supplies.

Engineering science has provided water supplies for our cities, the means of transportation of fresh food supplies and the means of removing waste.

There are, however, certain diseases in which the death rate is either constant or increasing. Public health activities with the assistance of all the sciences have failed to reduce the mortality from the degenerative diseases of later life. The prevention of these diseases depends largely upon the individual. Over indulgence in alcohol and tobacco, overeating, lack of proper exercise and over work are among the causes of degenerative diseases. Individuals must learn that they are responsible to their fellow beings and to their progeny, and that their manner of life is not a matter in which they alone are concerned. Science has made possible a far greater degree of personal hygiene than ever before. Innumerable inventions and discoveries make possible a more hygienic life than ever before. With the full utilization of all the social and individual contributions of science practically all of us should live out the allotted span of life.—Abst. *American Journal of Public Health*, 1915.

REPORT OF THE HYGIENIC LABORATORIES, OHIO STATE BOARD OF HEALTH, FOR THE MONTH ENDING MAY 31, 1915.

Diphtheria: Positive 55, negative 164, sus. 14	233
Tuberculosis: Positive 94, negative 254	348
Typhoid: Positive 8, negative 53, aty. 10	71
Para-typhoid A and B, negative 3	3
Malaria: Negative 3, unsatisfactory 1	4
Rabies: Positive 14, negative 10, unsatisfactory 1	25
Miscellaneous	21
Total diagnostic	705
Existing water supply 18, proposed water supply 9	27
Typhoid 15, quality 18	33
Stark County Survey	74
Wood County Survey	58
Columbus Tap	22
Sewage	1
Total water	215
Total number of examinations classified as above	920

REPORTED CASES OF NOTIFIABLE COMMUNICABLE DISEASES, MAY, 1915.

	Cities.	Villages and Townships.	Total.
Tuberculosis — all forms	476	88	564
Pneumonia	133	79	212
Typhoid Fever	150	59	209
Diphtheria	316	88	404
Whooping Cough	438	364	802
Measles	2,094	1,314	3,408
Scarlet Fever	409	238	647
Chickenpox	449	243	692
Smallpox	105	197	302
Mumps	258	339	597
Gonorrhea	112	49	161
Syphilis	67	6	73
German Measles	160	45	205
Epidemic Cerebro-Spinal Meningitis	7	5	12
Acute Anterior Poliomyelitis	1	2	3
Ophthalmia Neonatorum	57	6	63
Trachoma	22	9	31
Malaria	....	7	7
Dysentery	....	1	1
Typhus Fever	1	....	1
Tetanus	1	1	2
Septic Sore Throat	....	3	3
Total	5,256	3,143	8,399

COMMUNICABLE DISEASES, MAY 1915.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
ADAMS COUNTY—										
Manchester *Vil.*				1						
Tiffin *Tp.*		1								
Wayne *Tp.*						1				
ALLEN COUNTY—										
Delphos	1	1					2	1		
Lima	2	1	2				4	2		
Richland *Tp.*						4				
Bath *Tp.*	1						1			
ASHLAND COUNTY—										
Ashland				1						
Loudonville *Vil.*									2	
ASHTABULA COUNTY—										
Ashtabula		2	4				1			
Conneant	1	1		2						
Geneva *Vil.*	1	1								
Austinburg *Tp.*	1	1								
Monroe *Tp.*	1									
ATHENS COUNTY—										
Athens						23	1		1	1
Nelsonville				2						
Buchtel *Vil.*			1			70				
Chauncey *Vil.*	1			1						
Carthage *Tp.*					4					
Dover *Tp.*		1								
Lodi *Tp.*						4				
Waterloo *Tp.*		1								
York *Tp.*	1									
AUGLAIZE COUNTY—										
St. Marys				1					1	
Wapakoneta			1	1				2		
Buckland *Vil.*										1
Cridersville *Vil.*								2		
Minster *Vil.*							5	1	2	
New Bremen *Vil.*							1			
New Knoxville *Vil.*							1			
Uniopolis *Vil.*									1	
German *Tp.*							1			
Union *Tp.*									8	
BELMONT COUNTY—										
Bellaire	1	4	3		6	21		12		
Martins Ferry				1	1	1				
Barnesville *Vil.*					1					
Belmont *Vil.*						1				
Bethesda *Vil.*					2	1				
Bridgeport *Vil.*			1			1	11			
Brookside *Vil.*							1			
Holloway *Vil.*			1							
Morristown *Vil.*			1							
Shadyside *Vil.*					16					
Pultney *Tp.*				1						
Smith *Tp.*			1							
Wayne *Tp.*		1	1		3	2		4		
BROWN COUNTY—										
Ripley *Vil.*		1						1		
Clark *Tp.*							1			
Huntington *Tp.*	1									
Jefferson *Tp.*								1		
Perry *Tp.*						1				

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
BUTLER COUNTY—										
Hamilton	4			1	3	1	1			
Middletown	8	1	1	1		16	3			
Oxford *Vil.*						1				
Somerville *Vil.*						1				
Trenton *Vil.*					10					
Ross *Tp.*								1		11
Union *Tp.*										5
CARROLL COUNTY—										
Lee *Tp.*		1								
Washington *Tp.*								2		
CHAMPAIGN COUNTY—										
Urbana						3		1		
Adams *Tp.*										3
Concord *Tp.*										23
Mad River *Tp.*								2		
Salem *Tp.*	1									
Union *Tp.*						1				
CLARK COUNTY—										
Springfield	14		3	4	3	4	3	15		23
Donnelsville *Vil.*										2
New Carlisle *Vil.*						1				
Bethel *Tp.*		1					1			
German *Tp.*							2			
Mad River *Tp.*	1	1								
Springfield *Tp.*				1						
CLERMONT COUNTY—										
Amelia *Vil.*						2				
Bethel *Vil.*							1			
Loveland *Vil.*								1		
Owensville *Vil.*		1								5
Williamsburg *Vil.*						2				
Batavia *Tp.*						1				
Jackson *Tp.*						1				
Miami *Tp.*					1	2		3		
Pierce *Tp.*						1				
Tate *Tp.*		1				1				
CLINTON COUNTY—										
New Vienna *Vil.*	1									
Wilmington *Vil.*										2
Chester *Tp.*										1
Clark *Tp.*										1
Jefferson *Tp.*										1
Union *Tp.*			1							2
COLUMBIANA COUNTY—										
East Liverpool	3		2			2	4		7	
Salem	1		1	1			1	2		
Wellsvile	1		2	2			7			
Columbiana *Vil.*			1							
East Palestine *Vil.*						1				
Lisbon *Vil.*						1	1			
Salineville *Vil.*							1		7	
Wayne *Tp.*						1				
West *Tp.*			1	1		1				1
COSHOCTON COUNTY—										
Coshocton							3			
Adams *Tp.*							1		1	1
Clark *Tp.*								1		
Crawford *Tp.*			1						2	
Keene *Tp.*							1			
Oxford *Tp.*									2	
White Eyes *Tp.*									2	

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
CRAWFORD COUNTY—										
Bucyrus			1	1			2		1	
Galion	1			2		2				
Chatfield *Vil.*								2		
Crestline *Vil.*						30				
New Washington *Vil.*						1				
Bucyrus *Tp.*					8					
CUYAHOGA COUNTY—										
Cleveland	135	85	15	124	155	1,067	83	132	1	74
East Cleveland				5	3	37	1	2		2
Lakewood							1			
Berea *Vil.*									8	
Chagrin Falls *Vil.*	1									1
Cleveland Heights *Vil.*			1		2	20		10		
Euclid *Vil.*						1				
Linndale *Vil.*						1				
Olmsted Falls *Vil.*										1
Rocky River *Vil.*			1							
West Park *Vil.*				2		2				
Newburgh Heights *Vil.*					1	1				
Bedford *Tp.*				1						
Brooklyn *Tp.*				2						
Euclid *Tp.*				3		27				
Mayfield *Tp.*				1		1				
Middleburg *Tp.*									8	
Orange *Tp.*						6				
Parma *Tp.*						1				
Royalton *Tp.*						1				
Strongsville *Tp.*						1		2		
Warrensville *Tp.*			1							
DARKE COUNTY—										
Ansonia *Vil.*		1	1		5			5		
Burkettsville *Vil.*									2	
Hollansburg *Vil.*	1									
New Weston *Vil.*										1
Versailles *Vil.*							9			
Adams *Tp.*					3					11
Butler *Tp.*									1	
Franklin *Tp.*										2
Greenville *Tp.*							5			
Harrison *Tp.*	2									
Patterson *Tp.*							2			
Twin *Tp.*							1			
Wabash *Tp.*						6				1
York *Tp.*					1		1			3
DEFIANCE COUNTY—										
Defiance	1		2	3		5	17			
Ney *Vil.*							4			
Defiance *Tp.*						10				1
Highland *Tp.*						2	4			
Mark *Tp.*						1				
Noble *Tp.*						3				
Richland *Tp.*						6	1			
Tiffin *Tp.*				1			1			
Washington *Tp.*						2				
DELAWARE COUNTY—										
Delaware						3	5			
Delaware *Tp.*							1			
Porter *Tp.*			1				1			

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
ERIE COUNTY—										
Sandusky						1		5	4	2
Huron *Vil.*				1						
Milan *Vil.*	1									
Vermilion *Vil.*						15				
Florence *Tp.*	1									6
FAIRFIELD COUNTY—										
Lancaster			1			31				
Amanda *Vil.*						1				
Carroll *Vil.*	4					5				
Pickerington *Vil.*								1		
Pleasantville *Vil.*			1		6					
Berne *Tp.*						2				
Greenfield *Tp.*	2					5				
FAYETTE COUNTY—										
Washington C. H.			1			1				
Jeffersonville *Vil.*	1									
Green *Tp.*					4					
FRANKLIN COUNTY—										
Columbus	27	2	6	6	43	140	27	17		1
Bexley *Vil.*						1				
Canal Winchester *Vil.*					3					
East Linden *Vil.*						3				
Gahanna *Vil.*						2				
Groveport *Vil.*	1	1			2			1		
Harrisburg *Vil.*					24					
Linden Heights *Vil.*						2				
Westerville *Vil.*						3		2		5
Hanford *Vil.*					3					
Franklin *Tp.*				1						
Marion *Tp.*		1				4				
Sharon *Tp.*						5				
FULTON COUNTY—										
Fayette *Vil.*					4					
Amboy *Tp.*							1			
Gorham *Tp.*						1				3
GALLIA COUNTY—										
Gallipolis				1		4				
Cheshire *Tp.*		1						4		
Gallipolis *Tp.*		1								
Harrison *Tp.*						2				
Perry *Tp.*	1									
Walnut *Tp.*	1						2			
GEAUGA COUNTY—										
Chardon *Vil.*	1	1				1		4		1
Bainbridge *Tp.*							1	6		
Chester *Tp.*	1	1								
Huntsburg *Tp.*					2					1
Montville *Tp.*						1		10		
Newberry *Tp.*							2			
Thompson *Tp.*						2			2	
GREENE COUNTY—										
Bowersville *Vil.*								4		
Cedarville *Vil.*							2			
Bath *Tp.*	1							1		
Caesar Creek *Tp.*	2	2						3		
Jefferson *Tp.*								3		
New Jasper *Tp.*		1								
Sugar Creek *Tp.*					4		1			
GUERNSEY COUNTY—										
Cambridge			2	4			1	1		
Senecaville *Vil.*	1		1							
Center *Tp.*					1					

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
GUERNSEY COUNTY—Concluded.										
Jefferson *Tp.*							1			
Monroe *Tp.*		1					2			
Westland *Tp.*							2			
Wheeling *Tp.*							1			1
HAMILTON COUNTY—										
Cincinnati	131		12	50	28	208	23	43	3	69
Norwood	3		1	3		16		11		12
St. Bernard	1					3		2		
Addyston *Vil.*			1							
Elmwood Place *Vil.*						1			1	
Glendale *Vil.*	2						1			
Lockland *Vil.*								1		1
Madeira *Vil.*										1
Reading *Vil.*				1						
Wyoming *Vil.*						1				
Columbia *Tp.*				1						
Delhi *Tp.*				1						
Whitewater *Tp.*					2	3				
HANCOCK COUNTY—										
Findlay			1	3		7	7			
McComb *Vil.*						2				
Van Buren *Vil.*					2					
Amanda *Tp.*		2								
Cass *Tp.*										10
Delaware *Tp.*					1	1				2
HARDIN COUNTY—										
Kenton						2	1		2	
Ada *Vil.*						3	2		1	
Alger *Vil.*										1
Dunkirk *Vil.*								1		
Mt. Victory *Vil.*							3		14	
Blanchard *Tp.*	1									
Cessna *Tp.*			1							
Dudley *Tp.*	1	1								
Liberty *Tp.*							1		3	1
McDonald *Tp.*									5	
Pleasant *Tp.*	1									
HARRISON COUNTY—										
Moorefield *Tp.*							1			
HENRY COUNTY—										
Deshler *Vil.*				1						
Holgate *Vil.*	1									
Napoleon *Vil.*						1			5	
Napoleon *Tp.*				3						
Pleasant *Tp.*		1					4			
HIGHLAND COUNTY—										
Greenfield *Vil.*	1	1								
Leesburg *Vil.*					3					
Fairfield *Tp.*		1		1						
Paint *Tp.*					15					6
Washington *Tp.*	1			1						
HOCKING COUNTY—										
Benton *Tp.*						1				
Green *Tp.*				1						
Salt Creek *Tp.*						2				
Starr *Tp.*					1	3				
HOLMES COUNTY—										
Millersburg *Vil.*							2			
Berlin *Tp.*				1						
German *Tp.*									2	
Hardy *Tp.*	3						6			
Salt Creek *Tp.*				4						

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
HURON COUNTY—										
Bellevue	1			3	13	26	2	1		
Norwalk				1		28		7		
Chicago Junction *Vil.*	1		1			4				
Fairfield *Tp.*						1				
Greenfield *Tp.*						10				
Greenwich *Tp.*						1				
Norwich *Tp.*						4				
Richmond *Tp.*						5				1
Ripley *Tp.*						1				
Sherman *Tp.*			1							
Townsend *Tp.*			1		1	2		2		
Wakeman *Tp.*						14		1		
JACKSON COUNTY—										
Wellston	1									
Oak Hill *Vil.*									5	
Bloomfield *Vil.*	1									5
Hamilton *Tp.*							2			
JEFFERSON COUNTY—										
Steubenville	2		1	3			1			
Amsterdam *Vil.*	1							2	1	
Empire *Vil.*				2	2					
Mingo Junction *Vil.*							2			
Tiltonville *Vil.*					6					
Toronto *Vil.*	2	1	1							
Knox *Tp.*					1					
Springfield *Tp.*				1					1	
KNOX COUNTY—										
Mt. Vernon			1			14				
Fredericktown *Vil.*										2
Miller *Tp.*						1				
Pleasant *Tp.*						7				
LAKE COUNTY—										
Painesville						3			8	
Fairport Harbor *Vil.*	1									
Leroy *Tp.*									2	
Painesville *Tp.*									5	
LAWRENCE COUNTY—										
Ironton		1		2		31	1			
Hanging Rock *Vil.*						7				
Hamilton *Vil.*						6				
Rome *Tp.*						13	1			
Symmes *Tp.*										3
Upper Tp.						13				
LICKING COUNTY—										
Newark	6		1	6	8	39		9		
Alexandria *Vil.*						1				
Croton *Vil.*										1
Hanover *Vil.*					6	1				
Hebron *Vil.*					1					3
Johnstown *Vil.*					4	1				
Utica *Vil.*						2				
Bowling Green *Tp.*						8				
Burlington *Tp.*						3				
Etna *Tp.*						3				
Granville *Tp.*						1				
Hartford *Tp.*										3
Hopewell *Tp.*					3	2				
Jersey *Tp.*					5					
Liberty *Tp.*					2					
Lima *Tp.*	1				1					
Madison *Tp.*		1		1	12			1		

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.		Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
LICKING COUNTY—Concluded.											
Monroe	*Tp.*					1					
Newark	*Tp.*				1		2		2		
St. Albans	*Tp.*		1				4				
Union	*Tp.*	2				15	14		20		7
LOGAN COUNTY—											
Bellefontaine							1	2	9		
Belle Center	*Vil.*						1				
DeGraff	*Vil.*							1			
Quincy	*Vil.*					3					
Rushsylvania	*Vil.*									4	
West Liberty	*Vil.*		3				1				
Zanesfield	*Vil.*							2			
Lake	*Tp.*								1		
McArthur	*Tp.*		3								
Pleasant	*Tp.*							4			
Stokes	*Tp.*	1							3		
Zane	*Tp.*	2	1			1					
LORAIN COUNTY—											
Elyria		1			1	1	40			10	
Lorain		1	1		5	10	16	3	4		
Grafton	*Vil.*								10		
Oberlin	*Vil.*					1	26				1
Amherst	*Tp.*					2					
Avon	*Tp.*										9
Avon Lake	*Tp.*						1				
Brownhelm	*Tp.*						2		1		
Carlisle	*Tp.*									2	
Columbia	*Tp.*						12				
Eaton	*Tp.*						15		2		
Elyria	*Tp.*		1								
Grafton	*Tp.*						20				
La Grange	*Tp.*							1			
Ridgeville	*Tp.*						2			3	
Russia	*Tp.*						2				
Sheffield	*Tp.*					2					
LUCAS COUNTY—											
Toledo		68	2	58	13	62	112	12	79	6	5
Maumee	*Vil.*	1									
Sylvania	*Vil.*						2				
Waterville	*Vil.*							1			
Adams	*Tp.*						2			1	
Monclova	*Tp.*							1			
Sylvania	*Tp.*							1			
Washington	*Tp.*				1		61		9		
MADISON COUNTY—											
Mt. Sterling	*Vil.*							1			
Pike	*Tp.*								2		
MAHONING COUNTY—											
Youngstown		11	8	3	9	8	9	22	9	25	9
East Youngstown	*Vil.*	4			1		1		1		
Lowellville	*Vil.*										10
Poland	*Vil.*										6
Sebring	*Vil.*					1	8	2	4		1
Struthers	*Vil.*			1	2						
Boardman	*Tp.*		4	1	2						20
Coitsville	*Tp.*				1					1	16
Ellsworth	*Tp.*						1	1			
Poland	*Tp.*						2				
MARION COUNTY—											
Marion		1					22		2		
Larue	*Vil.*									3	
Morrall	*Vil.*	1					1			1	

COMMUNICABLE DISEASES, MAY 1915—Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
MARION COUNTY—Concluded.										
Prospect *Vil.*						3				
Big Island *Tp.*			1							
Bowling Green *Tp.*									5	
Claridon *Tp.*				1						
Grand *Tp.*									1	
Green Camp *Tp.*							5			
Montgomery *Tp.*									3	
Tully *Tp.*										1
MEDINA COUNTY—										
Medina *Vil.*						3	1			
Wadsworth *Vil.*	1					0				
Brunswick *Tp.*	1					15				
Chatham *Tp.*						11				1
Granger *Tpy*						26				
Guilford *Tp.*						1				
Hinckley *Tp.*				3		16		1		
Litchfield *Tp.*						3				
Sharon *Tp.*						5				
Wadsworth *Tp.*						1				
MEIGS COUNTY—										
Middleport *Vil.*				1						
Racine *Vil.*						10				
Bedford *Tp.*	1	1				20				
Chester *Tp.*	1									
Rutland *Tp.*						2	8			
Salem *Tp.*						1				
MERCER COUNTY—										
Celina *Vil.*							8			
Coldwater *Vil.*				1						
Mendon *Vil.*					10		1		1	
Rockford *Vil.*						12				
Butler *Tp.*			1	1						
Center *Tp.*							2			
Franklin *Tp.*							8			
Marion *Tp.*			1				2			
Recovery *Tp.*						1		3		
Union *Tp.*					2					
MIAMI COUNTY—										
Piqua	3	1		1	5	2				4
Covington *Vil.*					2			3		
Tippecanoe City *Vil.*				1						
West Milton *Vil.*			1							
Bethel *Tp.*							1			
Brown *Tp.*					5					2
Newberry *Tp.*								1		
Newton *Tp.*					3					
Union *Tp.*			1		2					
MONROE COUNTY—										
Clarington *Vil.*							2			
Green *Tp.*		1								
Sunsbury *Tp.*							2			
MONTGOMERY COUNTY—										
Dayton	30	11	10	7	80	66	61	48		33
Brookville *Vil.*						1	3			
Farmersville *Vil.*							1			
Germantown *Vil.*						22		1		
Miamisburg *Vil.*							4	6		
Butler *Tp.*					12					
German *Tp.*						47		17		10
Harrison *Tp.*						3	5			
Jackson *Tp.*					6	4	6			
Jefferson *Tp.*						1				
Perry *Tp.*	2	2			5	4				
Wayne *Tp.*							1			

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.		Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
MORGAN COUNTY—											
Chesterhill	*Vil.*										1
Stockport	*Vil.*					3					
Union	*Tp.*			1							
MORROW COUNTY—											
Sparta	*Vil.*						1				
South Bloomfield	*Tp.*						2				
Westfield	*Tp.*						1				
MUSKINGUM COUNTY—											
Zanesville		2		3	1	1	1				1
Adamsville	*Vil.*					1					
Frazeysburg	*Vil.*	1									
Meigs	*Tp.*	1									
Salem	*Tp.*					3					
Salt Creek	*Tp.*						1				
Wayne	*Tp.*					7					5
OTTAWA COUNTY—											
Oak Harbor	*Vil.*							2			
Port Clinton	*Vil.*									7	3
Put-in-Bay	*Vil.*								4		
Benton	*Tp.*							2			
Danbury	*Tp.*										1
Erie	*Tp.*		1								7
Harris	*Tp.*								7		
Portage	*Tp.*								1	1	
PAULDING COUNTY—											
Cecil	*Vil.*						7				
Grover Hill	*Vil.*						1			2	
Paulding	*Vil.*						7				
Auglaize	*Tp.*						4				
Carryall	*Tp.*										5
Crane	*Tp.*						18				
Emerald	*Tp.*						18			1	
Jackson	*Tp.*									8	
Latty	*Tp.*						1				
Paulding	*Tp.*						1			3	
Washington	*Tp.*	1								3	
PERRY COUNTY—											
Corning	*Vil.*								9		
New Lexington	*Vil.*					15					
New Straitsville	*Vil.*		2								
Santoy	*Vil.*	1									
Clayton	*Tp.*			1							
Coal	*Tp.*						1				
Jackson	*Tp.*		4				2				
Monroe	*Tp.*								13		
Pike	*Tp.*					1					
PICKAWAY COUNTY—											
Circleville		2				2					
Ashville	*Vil.*	1									
Tarlton	*Vil.*						4				
Circleville	*Tp.*						1				
Darby	*Tp.*					16					
Muhlenburg	*Tp.*	1									
Walnut	*Tp.*						2				
PIKE COUNTY—											
Pebble	*Tp.*		1						4		6
Seal	*Tp.*						6				
PORTAGE COUNTY—											
Ravenna					1			1			
Brimfield	*Tp.*						1	1			
Franklin	*Tp.*							1			
Freedom	*Tp.*		3								
Mantua	*Tp.*			1							
Ravenna	*Tp.*							1			

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
PREBLE COUNTY—										
Eaton *Vil.*								1		
Lewisburg *Vil.*					10					
New Paris *Vil.*					4					
West Alexandria *Vil.*				1						
West Elkton *Vil.*					13					
Dixon *Tp.*						1				
Harrison *Tp.*			1							
Israel *Tp.*							1			
PUTNAM COUNTY—										
Continental *Vil.*							1		3	
Cloverdale *Vil.*									14	
Dupont *Vil.*									1	
Glandorf *Vil.*					1					
Miller City *Vil.*	1				2					
Pandora *Vil.*	1					22				
West Leipsic *Vil.*					1					
Blanchard *Tp.*		1								
Liberty *Tp.*							2			
Palmer *Tp.*		1					2			
Monterey *Tp.*			2							
Perry *Tp.*									21	
Riley *Tp.*		1				20				
Sugar Creek *Tp.*									1	
Union *Tp.*		2								
RICHLAND COUNTY—										
Mansfield		1	1	2		2		4	9	5
Shelby *Vil.*						63				
Blooming Grove *Tp.*						2				
Cass *Tp.*			1			2				
Franklin *Tp.*						1				
Jackson *Tp.*						16				
Sharon *Tp.*						8				
Weller *Tp.*										1
ROSS COUNTY—										
Chillicothe	1	3		2				1	1	4
Bainbridge *Vil.*								5		
Franklin *Tp.*						2				
Green *Tp.*	1									
Harrison *Tp.*						3				
Huntington *Tp.*										10
Jefferson *Tp.*										8
Liberty *Tp.*						2				1
Paint *Tp.*										1
Scioto *Tp.*		1								
Twin *Tp.*										3
SANDUSKY COUNTY—										
Fremont		1	2			2	9	8		
Clyde *Vil.*							1			
Jackson *Tp.*			1							
Madison *Tp.*			1							
Rice *Tp.*							1			
Riley *Tp.*							1			
Townsend *Tp.*		4				8				
Washington *Tp.*									1	
York *Tp.*						4				
SCIOTO COUNTY										
Portsmouth	2		1	2			7	1		
Bloom *Tp.*									2	5
Morgan *Tp.*	3									
Vernon *Tp.*		1								
Washington *Tp.*			1							

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
SENECA COUNTY—										
Fostoria	1		3	2	1	1		2	15	
Tiffin				2		1		1		
Attica *Vil.*		1								
Green Spring *Vil.*			1							
Big Spring *Tp.*					2					
Eden *Tp.*					10					
Hopewell *Tp.*						2				
Jackson *Tp.*					1					
Liberty *Tp.*						5				
Reed *Tp.*						15				
Thompson *Tp.*							1			
Venice *Tp.*					5	4				
SHELBY COUNTY—										
Sidney				1		2	1			
Franklin *Tp.*								1		
STARK COUNTY—										
Alliance	4	4		2	2	4	3	4		
Canton	2	1	1	3		33	36	4	2	3
Massillon				2		19	1	1		
Limaville *Vil.*						1				
Magnolia *Vil.*				1						
Bethlehem *Tp.*						2				1
Canton *Tp.*	1					2				
Jackson *Tp.*				1					1	
Lake *Tp.*				1						
Lexington *Tp.*				1						
Marlboro *Tp.*							2			
Perry *Tp.*				2		5				
Plain *Tp.*				1			11			
Sugar Creek *Tp.*						5				
Tuscarawas *Tp.*				1						
SUMMIT COUNTY—										
Akron			1	28		5	43	6	3	
Barberton				1		2	1			
Cuyahoga Falls *Vil.*	1		13	1						
Hudson *Vil.*						1				
Kenmore *Vil.*						1	4			
Macedonia *Vil.*				1						
Bath *Tp.*			1			6				2
Copley *Tp.*					1		1			
Franklin *Tp.*							1			
Portage *Tp.*							1		3	
Springfield *Tp.*				1						
Tallmadge *Tp.*						1				
Twinsburg *Tp.*						36				
TRUMBULL COUNTY—										
Niles						3				
Warren	1	2	2	2		10				10
Girard *Vil.*						20	5	4		
Mineral Ridge *Vil.*		1								
Bristol *Tp.*						1	4			
Brookfield *Tp.*	1						1			
Hubbard *Tp.*		2								3
Southington *Tp.*			1							
Weathersfield *Tp.*	1					3				
TUSCARAWAS COUNTY—										
Canal Dover			1			1	1		1	
New Philadelphia					1			1		
Dennison *Vil.*				1						
Newcomerstown *Vil.*				1			1			
Uhrichsville *Vil.*				4			1			

COMMUNICABLE DISEASES, MAY 1915 — Continued.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.	Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
TUSCARAWAS COUNTY—Concluded.										
Fairfield Tp.			1							
Franklin Tp.							1			
Mill Tp.				4						
Rush Tp.				1						
Sandy Tp.										3
Warwick Tp.	1				12					
UNION COUNTY—										
Leesburg Tp.		1								
Liberty Tp.									4	
Union Tp.								4		
VAN WERT COUNTY—										
Convoy Vil.							7			
Ohio City Vil.				1		1				
Willshire Vil.						2				
Harrison Tp.					1	9				25
Jackson Tp.							1			
Liberty Tp.						25				
Ridge Tp.				1						
Tully Tp.							1			
Willshire Tp.						8				
VINTON COUNTY—										
Zaleski Vil.					2	5				
Brown Tp.				1						
WARREN COUNTY—										
Lebanon Vil.	1									5
Maineville Vil.						5				
Washington Tp.				1				2		4
Wayne Tp.								1		8
WASHINGTON COUNTY—										
Marietta	1					1	1			
Belpre Vil.						21				
Beverly Vil.										1
Belpre Tp.						22				
Marietta Tp.				1						
Warren Tp.										3
Watertown Tp.								2		
WAYNE COUNTY—										
Congress Vil.									1	
Doylestown Vil.						24				
Shreve Vil.								1		
Chippewa Tp.						9				
Congress Tp.									1	
East Union Tp.						4				
Greene Tp.		4				7				
Sugar Creek Tp.						12				
Wayne Tp.				2						
Wooster Tp.							4			
WILLIAMS COUNTY—										
Bryan Vil.	2						1			
Edgerton Vil.			1							
Montpelier Vil.					1	1		5		2
Pioneer Vil.					1	1				
St. Joseph Tp.			1							
Superior Tp.								5		
WOOD COUNTY—										
Bowling Green							3			
Bloomdale Vil.						1				
Millbury Vil.										1
Milton Center Vil.										1
Perrysburg Vil.							2	1		

COMMUNICABLE DISEASES, MAY 1915—Concluded.

This table records cases of specified diseases reported to the State Board of Health for the month of May, 1915.

Health District.		Tuberculosis (All Forms).	Pneumonia.	Typhoid Fever.	Diphtheria.	Whooping Cough.	Measles.	Scarlet Fever.	Chickenpox.	Smallpox.	Mumps.
WOOD COUNTY—Concluded.											
Portage	*Vil.*										3
Prairie Depot	*Vil.*							4			
West Millgrove	*Vil.*	1									
Walbridge	*Vil.*					1			1		
Liberty	*Tp.*							2			
Perry	*Tp.*									1	
Plain	*Tp.*							1			
Portage	*Tp.*				1						
Ross	*Tp.*				1						
Troy	*Tp.*				1						
Washington	*Tp.*					1					
WYANDOT COUNTY—											
Carey	*Vil.*				1		2				
Sycamore	*Vil.*				2						
Antrim	*Tp.*						1				

NUMBER AND DISTRIBUTION OF REPORTED CASES OF COMMUNICABLE DISEASES NOT INCLUDED IN THE GENERAL TABLE, MAY 1914.

Health District.	Gonorrhea.	Syphilis.	German Measles.	Epidemic Cerebro-spinal Meningitis.	Acute Anterior Poliomyelitis.	Ophthalmia Neonatorum.	Trachoma.	Other Notifiable Diseases.
ALLEN COUNTY—								
Delphos	3	1						
Lima	2	1	1					
Spencerville *Vil.*		1						
ASHTABULA COUNTY—								
Austinburg *Tp.*	1							
Dorset *Tp.*			5					
Kingsville *Tp.*			8					
Pierpont *Tp.*			2					
ATHENS COUNTY—								
Athens	2							
Buchtel *Vil.*		1						
Athens *Tp.*	1							
BELMONT COUNTY—								
Bellaire	1		4					
Morristown *Vil.*			5					
Colerain *Tp.*				1				
Pultney *Tp.*	1							
BROWN COUNTY—								
Huntington *Tp.*					1			
BUTLER COUNTY—								
Hamilton						2		
Middletown	6	3					1	
CLARK COUNTY—								
Springfield	9	4				1		
New Carlisle *Vil.*		1						
German *Tp.*	1							
CLERMONT COUNTY—								
Loveland *Vil.*			2					
Owensville *Vil.*	1					1		
Batavia *Tp.*			1					
Jackson *Tp.*	1							
Miami *Tp.*			3					
CLINTON COUNTY—								
Wilmington *Vil.*						1		
Jefferson *Tp.*			1					
COLUMBIANA COUNTY—								
East Liverpool	4	1						
Leetonia *Vil.*			2					
Middleton *Tp.*			1					
CRAWFORD COUNTY—								
New Washington *Vil.*			2					
CUYAHOGA COUNTY—								
Cleveland		1		2	1	45	6	*ab*2
Lakewood				1				
Royalton *Tp.*	1							
FAIRFIELD COUNTY—								
Lancaster	1							
FAYETTE COUNTY—								
Green *Tp.*	2							
Jasper *Tp.*	1							
FRANKLIN COUNTY—								
Columbus	3	1		2				
Groveport *Vil.*	1							
Brown *Tp.*								*c*2
GALLIA COUNTY—								
Gallipolis *Tp.*	2							
GREENE COUNTY—								
Caesar Creek *Tp.*	1							
GUERNSEY COUNTY—								
Monroe *Tp.*	2							

NUMBER AND DISTRIBUTION OF REPORTED CASES OF COMMUNICABLE DISEASES NOT INCLUDED IN THE GENERAL TABLE, MAY 1914 — Continued.

Health District.	Gonorrhea.	Syphilis.	German Measles.	Epidemic Cerebro-spinal Meningitis.	Acute Anterior Poliomyelitis.	Ophthalmia Neonatorum.	Trachoma.	Other Notifiable Diseases.
HAMILTON COUNTY—								
Cincinnati	14	12	134	2	......	1	4	......
Norwood	......	......	4	......	......	......	......	......
Cleves Vil.	......	......	2	......	......	......	......	......
Glendale Vil.	......	......	1	......	......	......	......	......
Lockland Vil.	......	......	1	......	......	......	......	......
Reading Vil.	......	......	1	......	......	......	......	......
Wyoming Vil.	......	......	2	......	......	......	......	......
Delhi Tp.	......	......	1	......	......	......	......	......
HANCOCK COUNTY—								
Madison Tp.	......	......	......	......	......	......	......	*a*1
HARDIN COUNTY—								
Ada Vil.	......	......	1	......	......	......	......	......
Dunkirk Vil.	1	......	......	......	......	......	......	......
Liberty Tp.	......	......	......	......	......	1	1	......
HIGHLAND COUNTY—								
Greenfield Vil.	1	......	......	......	......	......	......	......
Paint Tp.	......	......	......	......	......	......	1	......
HURON COUNTY—								
Bellevue	1	2	......	......	......	......	......	......
JEFFERSON COUNTY—								
Steubenville	......	1	......	......	......	......	......	......
LICKING COUNTY—								
Hartford Tp.	4	......	......	......	......	......	......	......
Union Tp.	5	......	......	......	......	......	......	*de*7
LOGAN COUNTY—								
Bellefontaine	......	......	1	......	......	......	......	......
LORAIN COUNTY—								
Elyria	......	......	4	......	......	......	......	......
Lorain	4	2	......	......	......	......	......	......
La Grange Tp.	......	......	1	......	......	......	......	......
LUCAS COUNTY—								
Toledo	37	32	1	......	......	3	1	......
MADISON COUNTY—								
London Vil.	2	......	......	......	......	......	......	......
Mt. Sterling Vil.	......	......	1	......	......	......	......	......
MAHONING COUNTY—								
Youngstown	4	5	1	......	......	3	1	......
East Youngstown Vil.	3	1	......	......	......	......	1	*c*1
Struthers Vil.	2	......	......	......	......	......	......	......
MEDINA COUNTY—								
Sharon Tp.	......	......	......	1	......	......	......	......
Spencer Tp.	1	......	......	......	......	......	......	......
Westfield Tp.	......	......	1	......	......	......	......	......
MIAMI COUNTY—								
Piqua	1	......	......	......	......	......	......	......
MONROE COUNTY—								
Sunsbury Tp.	......	......	......	......	......	......	4	......
MONTGOMERY COUNTY—								
Dayton	1	......	1	......	......	......	......	......
Harrison Tp.	......	......	......	1	......	......	......	......
Perry Tp.	......	......	......	......	......	......	1	......
Van Buren Tp.	......	......	......	......	......	1	......	......
MUSKINGUM COUNTY—								
Zanesville	2	......	......	......	......	......	......	......
Roseville Vil.	1	......	......	......	......	......	......	......
Meigs Tp.	1	......	......	......	......	......	......	......
PAULDING COUNTY—								
Antwerp	......	......	3	......	......	......	......	......
PICKAWAY COUNTY—								
Circleville	2	......	......	......	......	......	......	......
Williamsport	2	......	......	......	......	......	......	......

NUMBER AND DISTRIBUTION OF REPORTED CASES OF COMMUNICABLE DISEASES NOT INCLUDED IN THE GENERAL TABLE, MAY 1914 — Concluded.

Health District.	Gonorrhea.	Syphilis.	German Measles.	Epidemic Cerebro-spinal Meningitis.	Acute Anterior Poliomyelitis.	Ophthalmia Neonatorum.	Trachoma.	Other Notifiable Diseases.
PORTAGE COUNTY—								
Aurora *Tp.*			1					
Deerfield *Tp.*	1							
PUTNAM COUNTY—								
Ottawa							1	
RICHLAND COUNTY—								
Mansfield	2							
ROSS COUNTY—								
Chillicothe	1					1		
SANDUSKY COUNTY—								
Fremont			2					
York			2					
SCIOTO COUNTY—								
Portsmouth							6	
Morgan *Tp.*		1						
STARK COUNTY—								
Alliance	6	1	2			1		
Canton			5					
SUMMIT COUNTY—								
Akron							3	
Cuyahoga Falls *Vil.*		1						
TRUMBULL COUNTY—								
Niles	1							
Girard *Vil.*						1		
Hubbard *Tp.*	1							
TUSCARAWAS COUNTY—								
New Philadelphia	8							
UNION COUNTY—								
Darby *Tp.*	1							
Leesburg *Tp.*	1							
WARREN COUNTY—								
Lebanon *Vil.*	1							
South Lebanon *Vil.*						1		
Washington *Tp.*	1							
WAYNE COUNTY—								
Salt Creek *Tp.*	2							
Wooster *Tp.*				1				
WILLIAMS COUNTY—								
Montpelier *Vil.*	1							
Springfield *Tp.*				1				
WOOD COUNTY—								
Grand Rapids *Vil.*								*d*1
Millbury *Vil.*	1							
Milton Center *Vil.*	2							
WYANDOT COUNTY—								
Crane *Tp.*					1			

a Tetanus. *b* Typhus Fever. *c* Septic Sore Throat. *d* Malaria (6). *e* Dysentery (1).

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Critical Examination of 100 Painters for Evidence of Lead Poisoning, by E. R. Hayhurst, 16 p. Reprint, American Journal of the Medical Sciences, June 1914.

The Standardization of a Method for the Detection of Lead in Urine, by Charles A. Parkinson. 8 p. Reprint Monthly Bulletin, October 1914.

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Report on the Public Water Supply of Cleveland with Reference to the Treatment by Calcium Hypochlorite, by W. H. Dittoe and L. H. Van Buskirk. 44 p. Reprint Monthly Bulletin, January 1913.

The Value of a Pure Water Supply, by W. H. Dittoe, 6 p. Reprint Monthly Bulletin, January 1913.

The Disposal and Purification of Sewage, by C. B. Hoover, 10 p. Reprint Monthly Bulletin, October 1912.

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The Present Status of Sanitary Engineering, by John W. Hill. 11 p. Reprint Monthly Bulletin, 1914.

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The Benefits to Be Derived from a Public Water Supply and Sewerage System. W. H. Dittoe. 7 p. Reprint Monthly Bulletin, May 1914.

The Engineering Work of the State Board of Health, by W. H. Dittoe. 5 p. Reprint Monthly Bulletin, June 1914.

The Pollution of Streams in Ohio and the Effects of the Pollution on the Public Health, Live Stock, and Fish, by E. F. McCampbell and W. H. Dittoe. 17 p. Reprint Monthly Bulletin, October 1914.

Relative Values of Improvements Affecting the Sanitation of Villages, by W. H. Dittoe. 6 p. Reprint Monthly Bulletin, October 1914.

Public Water Supply for Cities — Some General Considerations, by W. H. Dittoe. 9 p. Reprint Monthly Bulletin, November 1914.

Advantages of the Use of Lime in Water Purification, by Charles P. Hoover and R. D. Scott. Reprint Monthly Bulletin, December 1914.

Prevention of Stream Pollution, by John W. Hill. Reprint Monthly Bulletin, December 1914.

Municipal Sanitation in Columbus, by W. H. Dittoe. Reprint Ohio Public Health Journal, January 1915.

Danger of Polluting the Public Water Supply by Industrial Connections, by L. H. Van Buskirk. 17 p. Reprint from Ohio Public Health Journal, March, 1915.

Report on Public Water Supplies on the Ohio River, by M. Z. Bair. 116 p. April, 1915.

Division of Plumbing Inspection.

Plumbing Code — Governing the Construction, Installation and Inspection of Plumbing and Drainage.

The Necessity of Plumbing Inspection in Rural Districts, by Wm. C. Groeniger. 9 p. Reprint Monthly Bulletin, October 1912.

Modern Plumbing and Its Relations to the Rural Health Officer, by Wm. C. Groeniger. 7 p. Reprint Monthly Bulletin, January 1914.

The Relation of Plumbing Inspection to Preventive Medicine, by Wm. C. Groeniger. Reprint Monthly Bulletin, March 1914.

Modern Conveniences in Rural Communities, by Wm. C. Groeniger. 6 p. Reprint Monthly Bulletin, August 1914.

Miscellaneous.

Municipal Meat Inspection, by David S. White. 11 p. Reprint Monthly Bulletin, February 1913.

A Constructive Program for Housing Reform, by Mildred Chadsey, 12 p. Reprint Monthly Bulletin, March 1913.

The Dental Phase of School Hygiene and Public Health Problems, by Homer C. Brown. 9 p. Reprint Monthly Bulletin, October 1913.

The Social Evil in Relation to the Health Problem, by J. H. Landis. 18 p. Reprint Monthly Bulletin, October 1913.

Our Duty in Public Dental Education and Our Relation to the Public Press, by Homer C. Brown. 11 p. Reprint Monthly Bulletin, July 1913.

Methods and Results of Medical Inspection in School District of 12,000, by E. R. Hayhurst. 13 p. Reprint Monthly Bulletin, November 1913.

An Ideal Organization of City Health Agencies, by J. H. Landis, M. D. 8 p. Reprint Monthly Bulletin, April 1914.

Some Weird Diagnoses as Observed by a Registrar of Vital Statistics, by C. E. Ford, M. D. 8 p. Reprint Monthly Bulletin, April 1914.

The School and Municipal Dental Clinic as an Economic Proposition, by Homer C. Brown, D. D. S. 6 p. Reprint Monthly Bulletin, April 1914.

Pathological Oral Conditions as a Source of Some Systemic Disturbances, by Homer C. Brown. 8 p. Reprint Monthly Bulletin, May 1911.

The Co-operation of Physicians and Dentists in the Conservation of Health, by J. H. J. Upham. Reprint Monthly Bulletin, December 1914.

Essential Factors in Establishing and Maintaining a High Standard of Public Health, by H. C. Brown. Reprint Monthly Bulletin, December 1914.

The Poisons Secreted by Animals, by E. F. McCampbell. Reprint Ohio Public Health Journal.

The Hilltop Tragedy, by V. C. Vaughan. Reprint Ohio Public Health Journal, February 1915.

Practical Food Inspection, by R. J. Carver. 13 p. Reprint from Ohio Public Health Journal, April, 1915.

DISEASES NOTIFIABLE IN OHIO

Report cases or suspected cases of the following diseases to the health officer having jurisdiction.

NOTIFIABLE INFECTIOUS DISEASES OF COMMON OCCURRENCE.

Chickenpox.
Diphtheria and Membranous Croup.
Gonorrhea.
Measles.
Measles, German.
Meningitis, Epidemic Cerebrospinal.
Mumps.
Ophthalmia Neonatorum.
Pneumonia, acute.
Poliomyelitis, acute infectious, (Infantile Paralysis).
Scarlet Fever.
Smallpox.
Syphilis.
Trachoma.
Tuberculosis, all forms, the organ or part affected to be specified.
Typhoid Fever.
Whooping Cough.

OTHER NOTIFIABLE INFECTIOUS DISEASES.

Actinomycosis.
Anthrax, human.
Cholera, Asiatic (cholera nostras when Asiatic cholera is present or threatened).
Continued fever lasting seven days.
Dengue.
Dysentery:
  a. Amebic.
  b. Bacillary.
Favus.
Glanders, human.
Hookworm Disease.
Leprosy.
Malaria.
Paragonimiasis.
Paratyphoid Fever.
Plague.
Rabies, human.
Rocky Mountain spotted, or tick fever.
Septic sore throat.
Tetanus.
Trichinosis.
Typhus Fever.
Yellow Fever.

OCCUPATIONAL DISEASES AND DISABILITIES.

Anilin Poisoning.
Arsenic Poisoning.
Benzine (Gasoline) Poisoning.
Benzol Poisoning.
Bisulphide of Carbon Poisoning.
Brass Poisoning.
Carbon Monoxide Poisoning.
Compressed-air Illness.
Dinitrobenzine Poisoning.
Lead Poisoning.
Mercury Poisoning.
Naphtha Poisoning.
Natural Gas Poisoning.
Phosphorus Poisoning.
Turpentine Poisoning.
Wood Alcohol Poisoning.

Any other disease or disability contracted as a result of the nature of the person's employment.

DISEASES OF UNKNOWN ORIGIN.

Cancer.
Pellagra.